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VIEWS, NEWS AND INTERVIEWS.

At the intersections of streets where the electric arc lamps are hung is a curious bit of city bird life, says a Kansas City paper. The lights are covered by big metal cones inside of which a board crosses holding the bar that suspends the lamp. One day the man who replenishes the lights with carbons lowered the lamp to the street. While he was putting in the carbons a hen sparrow flew about his head chirping angrily. A crowd was attracted by the novel sight, and when the people got near enough they saw the sparrow's nest on the board inside the cone and in it three young birds with gaping red mouths. The lamp man attended to his business as though it were nothing strange.

"Is that a sparrow's nest?" asked the man who always wants to know.

"No, it's a man in swimming," replied the lamp man, sarcastically, for he had evidently answered the question before.

Later he said that almost every lamp cone in town had a sparrow's nest inside it. At first the lamp men tore them out whenever found, but the sparrows would rebuild the nest in a day or two, and the men gave it up and let them remain. The sparrows find a high, swinging, airy home in the cones, safe from cats and bad boys.

THE FIRST ATLANTIC CABLE.

A GREAT HISTORICAL PAINTING SHOWING THE PROJECTORS OF THE ATLANTIC CABLE IN CONFERENCE AT THE RESIDENCE OF CYRUS W. FIELD, NEW YORK.

"THE PROJECTORS OF THE ATLANTIC CABLE."—A SPLENDID REPRODUCTION OF THE HISTORICAL PAINTING RECENTLY PRESENTED TO THE CHAMBER OF COMMERCE, NEW YORK.—PETER COOPER IN THE CHAIR, AND CYRUS W. FIELD STANDING IN THE FRONT.

The ELECTRICAL REVIEW presents on this page an effective reproduction in half-tone of the historical painting entitled "The Projectors of the Atlantic Cable." It was recently presented to the Chamber of Com-

merce, New York, and it is due to the courtesy of Secretary Wilson that we are enabled to publish this exact reproduction. Below, in this column, appear the names of the gentlemen composing the group. It represents a meeting at the residence of Mr. Cyrus W. Field, Gramercy Park, New York, Mr. Peter Cooper presiding. Mr. Field, standing in front, is calling attention to a chart of Trinity Bay, pointing to Heart's Content as a safe harbor for landing the cable. David Dudley Field stands by the president with a law book. Chandler White is handing estimates of expense to Marshall O. Roberts; next to whom, at the table, is Moses Taylor. At the end of the table stands Wilson G. Hunt. Prof. Samuel F. B. Morse is standing behind Mr. Roberts, and by his side the artist, sketching. The canvas is seven feet by nine. The cost was $20,000, exclusive of the massive gilt frame, which cost $500 more. The painting hangs on the west wall of the Board room, opposite the president's desk.

The following were the donors: Estate of Peter Cooper, by Abram S. Hewitt, executor; estate of Wilson G. Hunt, by Edward T. Hunt and Ellen D. Hunt, executor and executrix; Morris K. Jesup, Miss Mary M. Roberts, George J. Gould, the Western Union Telegraph Company, by Thomas T. Eckert, president; J. Pierpont Morgan, John T. Terry, Edwin Gould, John Crosby Brown, James McCreery, John Claflin, Mrs. Melissa P. Dodge, Charles Lanier, William E. Dodge, James Speyer, D. Willis James, John Sloane, Samuel D. Babcock, James A. Hearn & Son, James M. Constable, James W. Pinchot, C. Vanderbilt, R. H. Macy & Company, Mrs. Percy R. Pyne, Charles L. Tiffany, George C. Taylor, H. C. Fahnestock, Mrs. Robert Winthrop, John L. Riker, Mrs. George Lewis, Jr., Malcolm Graham, Henry A. C. Taylor, D. O. Mills, F. Frederick Gunther, A. A. Low, Kuhn, Loeb & Company, W. Bayard Cutting, Cornelius N. Bliss, C. P. Huntington, Charles A. Hoyt, John D. Crimmins, Hugh N. Camp, John D. Jones, William H. Webb, Charles Butler, Henry Hentz, John S. Kennedy, Alexander E. Orr, Isaac Stern, George Bliss and Richard T. Wilson.

Hon. Chauncey M. Depew was the orator of the occasion when the picture was presented to the Chamber of Commerce, and President Alexander S. Orr was in the chair. The committee having the work in charge were Morris K. Jesup, Abram S. Hewett and Wm. E. Dodge, and Mr. Jesup as chairman made the presentation, saying:

Mr. President and Fellow Members of the Chamber of Commerce: In October, 1892, the Chamber requested its Executive Committee to suggest some plan by which an appropriate and lasting memorial of the great work of Mr. Cyrus W. Field in the establishment of the Atlantic cable may be preserved. On the 6th of April following, the Executive Committee reported that after consideration of the matter, and in view of their knowledge of the long-cherished desire of Mr. Field that the memory of the achievement should be perpetuated in the form of a great historical painting, in which the lineaments and figures of the projectors should appear, they recommended that arrangements be made with Mr. Daniel Huntington, the distinguished artist, to execute a work of this character, to be displayed on the walls of the Chamber. This suggestion was unanimously adopted and a special committee appointed to carry it out. Of this committee I had the honor of being made its chairman, with Messrs. Abram S. Hewitt and William E. Dodge as associates. Shortly after a conference was had with the artist, and after hearing from him a description of the proposed work, an order was given for its execution. Mr. Huntington at once entered upon the difficult and laborious task, and for more than a year has given the closest attention and applied to it his best skill; the result you now have before you."

In concluding his speech of presentation Mr. Jesup read two letters, one from the painter of the picture and the other from Associate Justice Field of the United States Supreme Court. In Mr. Huntington's letter the artist explained that he got the first thought of the picture from Cyrus W. Field. He said that after the completion of the cable in 1866, and after its success was assured, Mr. Field called at the artist's studio and suggested that the group be painted. Mr. Huntington accompanied Mr. Field to the latter's residence in Gramercy Park and Mr. Cooper was sent for. He approved the idea and so did Mr. Roberts, but others of the projectors objected, and the matter was dropped for a number of years. Mr. Field was of course greatly disappointed. Finally, in 1894, the question was reopened, and Mr. Huntington was ordered to make the picture. Justice Field of the United States Supreme Court, a brother of Cyrus W. Field, wrote as follows:

WASHINGTON, D. C., May 20, 1893.

To the Chamber of Commerce of New York: I have to acknowledge your kind invitation to be present at the unveiling of the painting of the projectors of the Atlantic cable. Few subjects are more worthy of the genius of the artist or the historian. When Columbus discovered the New World it was almost as far away from the Old World as if it had been in another planet. Improvements in the art of navigation brought the continents nearer to each other, but it was reserved to modern science to make it possible to have instantaneous communication. The mere conception was almost a divine inspiration, but to carry it into execution was the work of 12 laborious years—years interrupted by defeats and disappointments that would have broken down the courage of most men. All this I had reason to know from my relation to one who took such a part in the enterprise, and hence I should be with you on an occasion of so much interest but that it comes in the very last week of the court. You need, however, no individual presence. The great painting before you speaks for itself. The faces there portrayed are familiar to the people of New York as among those of their most honored citizens. All of them are now gone from the world, but the remembrance of what they did may well be a matter of pride to their children, and it is fitting that this historic scene should be put on canvas by your distinguished artist and placed in the great hall of your Chamber of Commerce to preserve the memory of it to future generations. I am, with great respect, yours very sincerely,

STEPHEN J. FIELD.

After the reading of Justice Field's letter, Mr. Depew delivered the oration. At the conclusion of the oration, President Orr, in behalf of the Chamber of Commerce, made a speech of acceptance.

Keeping Everlastingly at It Brings Success.

Genius is really only the power of making continuous efforts. The line between failure and success is so fine that we scarcely know when we pass it—so fine that we are often on the line and do not know it. How many a man has thrown up his hands at a time when a little more effort, a little more patience, would have achieved success. As the tide goes clear out, so it comes clear in. In business, sometimes prospects may seem darkest when really they are on the turn. A little more persistence, a little more effort, and what seemed hopeless failure may turn to glorious success. There is no failure except in no longer trying. There is no defeat except from within, no really insurmountable barrier save our own inherent weakness of purpose.

The Citizens' Electric Railway, of Newport, R. I., will be built at once. The contract has been awarded and construction commenced.

IN THE NIGHT WATCHES.

AN IDYL OF THE FIN DE SIECLE.

"Frank—*Frank—Do* wake up!" (Elbow).

"Err, waw, wha's mar-r," said a sleepy voice.

"Oh! Frank, do get up and get baby something; she's crying *dreadfully.*"

"Crying, wha' for—switch on phonograph—Num' 14—tha'll fix her. Lemme go sleep."

"Oh! dear, what a thing to marry an electrician. I shall never remember all these switches."

But Mary managed to find "Num' 14," and a sweet voice began to warble a little Schlummer hied of Schubert's. It didn't fix baby though. She cried worse than ever.

"Frank, dear, you *must* get up. I'm *sure* baby's seriously ill."

"Oh! dear me—all right," mumbled the victim. "Switch on the light, Polly," and Polly did remember that No. 3 was the light tap. "Now," said Frank, "7's the food warmer," and Mary turned on No. 7.

"Well, Frank," said she, "I really do think this is better than the old days, when you never could find the matches." "Yes, and when I used to wear my shins in mourning with little patches of court plaster. It's rather cool out here though; Polly, turn on about a quarter of an ampere more."

"Frank, do you really think those electric radiators are safe? Won't they get too hot or explode or something?"

"Safe! Course they're safe; get too hot, fuse blows, that's all. Here, Mary, this thing's hot now, what do you want to give that cherub—pap or peppermint?"

"Pap! Frank, it isn't pap, it's 'Norton's Nursery Nutriment,' the best thing in the world for babies, and Mrs. Van Goelet Rensselaer says ——."

"What does *she* know about babies? She's always shouting at some meeting about 'female franchise' and 'woman's wrongs,' and, well, here's your nutriment all right now. Just switch off the Patti lullaby business, please—I believe that baby's fast asleep."

"No, she isn't; just look at her little sweet blue eyes; you *darling*" (kiss, kiss).

"Well now, Mary, how is that child to get her 'nutriment,' if you go on like that."

Miss Baby condescended to partake of only one or two spoonfuls of nutriment, and then began to 'goo, goo," and twist her small hands in her papa's hair.

"Polly, this young woman will be as pretty as you in about 17 years," said Frank.

"Don't be silly, and if baby won't take any more you needn't play with her any longer. But isn't it getting very close?"

"All right, turn on the fan ozonizer a few minutes. If my domestic duties are ended I'll turn in and get to sleep."

And Frank turned in. "Ow! what's that? Mary do you know your feet are like a jelly fish on ice?"

"Are they cold, Frank? Perhaps they are."

"Cold! I should say so; what's the use of that footwarming attachment if you don't use it?"

"Well! I'll try it dear; this little one isn't it." BANG—*crash—ling—whirr!*

"Wa-a-a-h," from Miss Baby.

"Heavens, Polly; you got the wrong switch. That's the 'burglar-scare' in the front hall."

"Poor little sing, was she frightened zen? Mamma's darling—um! um!" Sobs from baby, gradually subsiding.

"Now, Polly; I'm going to sleep"—a subdued *B-r-r* from the telephone. "Hang it, there's the station. Thank goodness with these new receivers I don't have to get out of bed. Well, Tom." "Mr. Brown, sorr." "Well." "Are yez there, sorr?" "Yes, I'm here; what is it?" "Hot-box, sorr, on No. 3." "Switch over on No. 2—she'll carry it all right; and, say Tom?" "Sorr." "I got a telephone from 'Frisco. I am going over on the electric special at nine, be back about one. Tell Mr. Williams, will you?"

"All right, sorr. Good night to yez."

"Now, Mrs. Brown; *perhaps*, I can go to sleep." "Yes, dear." "*Listen*, Polly; do you hear that?" "Oh! yes; *lovely* isn't it?" "If you call Wagner lovely; that's the wind-up to Tannhäuser, in New York. Let's see Denver, 2 A. M. New York, yes that's it—that long-distance switch must be open. Now, remember, if you wake up first, kitchen stove is No. 1, radiator in sitting room No. 8."

"Yes, dear; I put the steak in and the kettle on before I came to bed, so everything will be ready."

(Two hours later).

In a frightened whisper, "Frank! Frank!" (more feminine elbow). "Oh! Polly, lemme-go-s'eep." "Yes, but there's a burglar in the house!" "Awn; never mind." "But he'll get to the safe and get all the silver and things!" "If he gets hold—handle—get fits." "But, Frank." "Yes (Brr), I hear him—he's in the kitchen now (Brr); now he's in the side hall (Brr); now he's in the sitting room (Brr); now he's going over by the safe. Hold on now." "Yow!" from downstairs; "*Murderr, Howly Moses*, I'm kilt."

(Telephone) — "Mr. Brown." "Hello." "This is Central Police Station; there's an alarm from your safe." "Yes, I know; there's a man at it, he can't leave, either; let one of your men come up on the electric underground and at the Jones street station there's an entrance to my cellar. I must have left it open. Let your man open switch behind sitting room door before he takes burglar. He won't find him any trouble; better give him something when you get him, he'll be rather tired—much obliged, Chief; good night."

J. E. T.

"A Trolley Organ's Brassy Talk."

Under the above heading the New York *Recorder*, in its issue of June 7, gives vent to the following editorial attack on the ELECTRICAL REVIEW.

The daily *Recorder*, which is devoting its puny strength to the laudable attempt to regulate all creation, is still smarting under the failure of the causeless Brooklyn trolley strike which it supported with the little remaining influence it possesses. It is now attacking at all times the trolley interests of the country as well as the business-like and successful administration of Mayor Schieren, of Brooklyn. Its methods are well typified in the following abortive screed which as a matter of record is presented below:

Everybody knows what the spirit of the Brooklyn trolley shark is. It is one of callous indifference to the rights of the individual citizen and obstinate hostility to collective public opinion. It is one of willingness to see human lives sacrificed by scores indefinitely rather than relinquish one dollar of dividends on capital created by a fiction that is in its essence as fraudulent as forgery itself. It is one of readiness to fill 109 graves, or twice as many, so long as it can gorge itself with illegitimate profits. It is one that cares not how much killing and maiming is done by its criminal neglect so long as its coffers are kept full and its responsible directors can escape unwhipped of justice.

Such is the recognized spirit of Brooklyn trolleydom, but it is not often so frankly and bluntly acknowledged by its own mouth-piece as in the latest issue of the ELECTRICAL REVIEW. That corporation-collared publication editorially says:

> The secret of the thing lies here: Rapid transit requires a clear roadway. As long as children, grown people and trucks get in the way of rapid-transit cars there'll be trouble and accidents. Keep the people on the sidewalks, where they belong. Let the cars bunt a few trucks and they'll stay where they belong. Then our Brooklyn friends can get what they badly need—real rapid transit.

This is the brassiest expression of the true trolley spirit that we have ever seen in print. We have all known for a long time that the trolley managers felt exactly that way and their whole policy has had for its keynote the same insolent assumption which underlies the above-quoted remark, namely, that the men, women and children of Brooklyn have no rights in their own public streets, which the trolley corporations are bound to respect. "Keep the people on the sidewalks, where they belong," says the special organ of the electrical trade and the allied trolley interests. If people cannot reach their homes or places of business, if women cannot do their shopping, or if children cannot go to and from school—as we all know they cannot—without leaving the sidewalks and crossing the roadways, that is their misfortune; and whenever they are killed their families must regard it as a necessary and indispensable sacrifice for the benefit of rapid transit in general and of the watered-stock holders of trolleydom in particular.

That is the plain, outspoken opinion of the trolley kings as formulated in the ELECTRICAL REVIEW. It is their deliberate judgment that the real wrong that needs to be righted in Brooklyn is not their own criminal neglect to provide their cars with real instead of "fake" fenders, but the criminal carelessness of the people of Brooklyn, and especially the children, in not keeping always "on the sidewalks, where they belong," and attempting to cross the streets as if they had any business or right there, or were in any sense free to enjoy their own highways.

It is well that once in a while the brutal trolley spirit should be thus publicly blurted out and put into cold type so that nobody need make any mistake about it. It helps greatly to clear away all doubts as to the duty of the people of Brooklyn to carry on the war against these chartered rogues until they are either kicked out of the streets forever or compelled to use them with a decent and proper regard for the lives, limbs and lawful liberties of citizens.

A Country Electric Railway.

Mr. A. Bauman, of Lancaster, Ohio, is at the head of a new electric railway project that is of considerable interest. Nearly two years ago the Lancaster, Ohio, Street Railroad Company made a contract with the Lancaster Electric Street Railroad Company, a new corporation, by which the old company was to relay its tracks with 52-pound girder rails, bond the track and permit the paving of the streets. Under this contract the old company sold its horses, relaid and bonded its tracks as far as the streets were paved. In July, 1893, the financial crash came and the new electric company failed to place its bonds as agreed, and this left the old company with a new track, a few small horse cars and quite a sum of money borrowed on which interest was increasing.

The stockholders have now decided to sell the road, and Mr. Bauman and others intend to purchase and equip it, and later on build to Dumontville, Basil, Baltimore and Millersport at Buckeye Lake Park, a view of which is shown in Fig. 2; a total distance right through the country of 15 miles. This lake is the only large body of water in central Ohio, and has been made a State park. Columbus parties have acquired the right of way on the National Pike to Hebron, and will build an electric road, and will, no doubt, extend to Millersport, connecting with the Lancaster road. This line from Columbus will be 30 miles long.

Another paying route of six miles to the Boys' Industrial Home will probably also be built by the Lancaster company. These routes will undoubtedly pay from the first day they are built. Farmers along the line are quite jubilant over the situation. They can now go to the towns and transact their business at a less expense than it costs to feed their horses, and ride all the way in a comfortable covered car, getting on and off at their various doors along the line.

The ELECTRICAL REVIEW presents this as a beginning of the electric transit system which is to supplant our country road methods of travel by team.

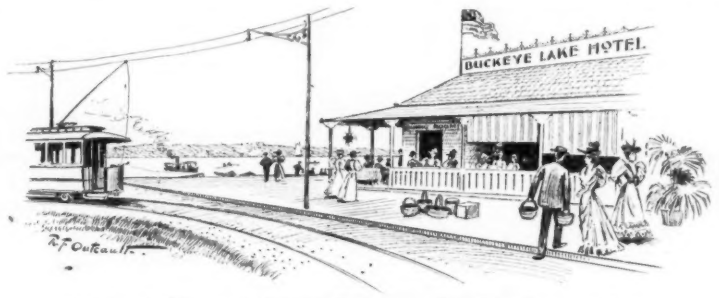

FIG. 1.—A COUNTRY ELECTRIC RAILWAY.—ONE POINT ON THE LINE.

FIG. 2.—A VIEW OF THE PASSENGER AND COUNTRY TRUCK CAR, AND THE METHODS OF THE ALERT ADVERTISER.

RAILWAY ENTERPRISE IN EGYPT.

BY FREDERIC C. PENFIELD, CONSUL-GENERAL AT CAIRO.

In no way is the industrial progress of Egypt better illustrated than by the present development of its railway system. Railway building is not a recent innovation in the ancient land of the Nile, however, as the first line—from Alexandria to Cairo—dates from 1852; and five years later the English engineer, Robert Stephenson, completed rail communication between Alexandria and Suez, with the exception of a short suburban road from Alexandria along the Mediterranean to Ramleh, a 15-mile line connecting Cairo with the health resort of Helouan, and a steam tramway on the bank of the Suez Canal, joining Port Said with Ismailia. These private enterprises, as well as the government lines, are very profitable. The income of the latter is pledged to certain European creditors of the country, as a partial consequence of the extravagance of Khedive Ismail.

A network of rails spreads over most of the delta, and the main line has for two or three years extended southward in the Nile valley to Girgeh, 336 miles from Cairo. Two years hence the road will be completed to Keneh, 66 miles further south; and contracts have just been signed for carrying it to Assouan, the frontier town of Egypt, at the first cataract of the Nile, and 710 miles from the Mediterranean. This terminus is expected to be reached in time for the Upper Nile tourist traffic of 1897–98.

The moderate speed at which all trains are driven, save the expresses, and the cheapness of native labor permit the working expenses to be kept much below the European average. A level country, with frosts and violent storms unknown, makes railway construction a simple matter. Rock blasting, tunneling, excavating and trestle building are practically unnecessary. Bridging the Nile, however, is expensive. The present cost of construction in the delta, where bridges over irrigating canals are numerous, averages $28,000 per mile of normal gauge; but in Upper Egypt the cost is not more than $25,000. The narrow gauge (one metre) extension from Keneh to Assouan is to cost only $12,500 a mile.

Most of the locomotives come from Belgium, and the first-class passenger cars from England. Rails are also supplied by England, and bridge work by Belgian and French firms. Most of the engineers and firemen are natives, the former receiving from $30 to $75 per month, and the latter from $12.50 to $20 per month; the few European engineers employed average $100 per month. The railways are managed by an international administrative board of three, the chairman of which is an Englishman. The others are, respectively, French and Egyptian, and heads of departments represent nearly every European country. Sealed tenders for all materials are invited from English and other European industrial centers, and the most advantageous offers accepted.

Street railways with electric traction are promised for Cairo next year, the concessionaires being Belgians; and Alexandria is expected soon to follow suit. There are several bidders for a concession for an electric tram line from Cairo to the Pyramids, a distance of 10 miles, to accommodate the enormous number of Winter visitors to the capital. The Egyptian ministry recently had from a Frenchman a serious application for permission to build a "funicula" railway to the top of the great pyramid. The request was not taken into consideration.

It is said that Egypt, in proportion to population, has more railway mileage and better service than Austria, Hungary, Spain or Portugal. All railways are government property, making the "overland route" to India as practicable for freighting as it had been for passenger traffic. This is now almost wholly superseded by the great canal of De Lesseps.

USES OF ACCUMULATORS.

PAPER READ BEFORE THE NORTHERN SOCIETY OF ELECTRICAL ENGINEERS, MANCHESTER, MAY 13, 1895, BY J. C. HOWELL, ESQ.

When I was first asked by one of the members of your council to prepare a paper upon accumulators I was much concerned as to the course I should take, whether I should cry off on the ground that it was useless raking up the ashes of a dead industry, or boldly enter the vault in which low tension had been entombed and seize what relics I could bring to before you of the wisdom of the ancients. Finally, I chose the latter course and my investigations have been rewarded by the discovery of a leaden scroll upon which had been traced, evidently electrolytically in characters of peroxide a long poetic prophetic account of the final triumph of electric storage systems, a rough prose translation of which I shall attempt to give you to-night.

The scroll commences with a long historic account of the birth of the first electric storage systems, describing in turn the early experiments of Gautherot, Ritter, Gaston Plante, with his leaden plates; Grove with plates of oxygen and hydrogen fitted with platinum electrodes; Faure, Sellon, Volckmar and a host of others, chronicles the historic passage across the channel of the box with its 1,000,000-foot pounds of stored up energy, and finally settles down to the sober consideration of the chemical actions involved in the charge and discharge of the cells, as the new boxes were styled. One cannot help admiring the ingenuity of the old scribe in twisting into proper rhythm long lists of chemical formulas, but with these we shall not concern ourselves to-night, but hasten on to that portion where the uses to which accumulators were put are described, with more or less detail, as being far more interesting to the majority of us who are, I understand, more connected with the practical development of electricity than with its theoretical and mathematical aspect.

The first uses to which these accumulators were practically put was for maintaining continuity of supply, or what is now called constant service in country house electric lighting work. In the very early days of electric lighting it was discovered that in this class of work it was essential that the light should be available any hour of the day or night, and that people were prepared to pay considerable sums for the use of an apparatus which would give them this regularity of supply, and so avoid the necessity of keeping a man or men continually looking after moving machinery. Although the capital cost of these early accumulators was exceedingly high, it was speedily found that the annual saving effected by their use was sufficiently large to recompense the purchaser for his outlay, except in cases where water power was available. In gas engine work, and with steam engines the accumulators were found to be working at their best efficiency at a time when, had the motorial plant been in operation, it would have been working at its worst efficiency, and instances are recorded where, by the adoption of accumulators, the gas bill had been reduced to 50 per cent of what it was when the supply of electricity for household service was obtained from the dynamo driven directly by the engine, and this difference in a case where the former supply had not been constant service.

Unfortunately, the construction of these first accumulators was defective, and for a while accumulators became discredited owing to the frequent breakdown of the plates, of which they were composed, and the falling away of the active material, which permitted what we shall call the storage action to take place. By slow degrees these faults in construction were discovered and remedied. Then a more abstruse series of faults developed, viz., those due to the peculiarity of the chemical actions, which were going on in the cell, and which required time to show themselves. These too in turn were carefully investigated by earnest men, who devoted their lives to research, until at last, by the law of the survival of the fittest, manufacturers were able to produce accumulators which they were prepared to guarantee and maintain for a series of years.

During this period other departments of electrical industry had not been idle and the electric light had become so popularized that central stations were established for the supply of electricity The public were at first contented with a supply which would suffice for the ordinary hours of lighting, but, as they began to appreciate the benefits of the new illuminant, they were not content with a partial supply, but required it at all hours of the day or night, and men's minds were directed to find some means for providing this supply in an economical way. Had the public been content to maintain their demand for lighting at a normal rate whenever they required it, it would have been easy for the central stations to supply electricity in an economical manner, but the public, proverbially fickle, required their supply in an extraordinary fashion. At certain periods of the day they were content to ask for only some one per cent of what their normal demand was, and moreover required that the supply at this period should not be charged for at a higher rate than when the demand was just 100 times in excess. Although it had struck many long-sighted engineers that the public supply of electricity would have to be dealt with finally in much the same fashion as the public supply of water or gas had been dealt with, no one, the scroll narrates, had realized how greatly the demand for lighting at different times of the day varied, and the ordinary engineer greeted the publication of the first load curve of a central station that was published with a smile of wondering bewilderment. Such curves in the after history of electric lighting became common and comparisons were instituted between curves obtained for various districts, various cities and various countries, and it was found that there was a very considerable amount of uniformity throughout the world. In process of time the different characteristics of the load curve for Summer and Winter were established, and it became more and more evident that, unless some satisfactory means of providing for this inequality of demand was discovered, electric lighting would forever remain a luxury.

The accumulator manufacturers considered that they held the key to the solution of the difficulty, and at Colchester set down a system which was intended to demonstrate to all the world that the difficulty had been satisfactorily met. The problem was, however, unfortunately tackled by men who were probably thoroughly conversant with the batteries manufactured at the time, but had very little knowledge of the public needs, and, after some years of work, the scheme had to be abandonded, and other methods tried. The scheme had, however, in showing the difficulties to be encountered, shown also considerable promise for the future, and it was discovered that accumulators, to be of real service in central station work, had to be capable of meeting for short periods, demands considerably in excess of their normal capacity. This was difficult of attainment, as, owing to the chemical actions taking place on the plates which formed the active portion of the accumulator. Any supply of electricity drawn at too rapid a rate would tend to break down the materials which composed the plate; and furthermore, did not provide sufficient time for the electrolyte to diffuse itself so as to keep up the chemical reactions involved in the supply of electricity. This fact being properly appreciated speedily led to the development of accumulators, which could, on being called upon, discharge at very rapid rates, and, although these accumulators were costly, it was discovered that their freedom from breakdown in trying circumstances was such as to warrant a trial being made on sufficiently large scale to see whether this new form would be fully equal to all the requirements of central station practice. Reliable statistics too were at this time available, so that engineers could fully realize the costs of working under the peculiar conditions which the public demanded, and it was found that the cost of fuel was from four to six times what had been expected from the results obtained when working an engine and dynamo under test. The facility with which electrical measurements could be made had trained men's minds for the investigation of the various losses occurring in the transformation of energy, and central station engineers became more and more aware of the necessity of dealing with all these losses so as to enable them to compete on more and more favorable terms with other systems of illumination that had been in vogue.

A discussion upon these sources of loss, and the way in which by the use of accumulators these losses can be minimized is the real object of the leaden scroll, and to make matters clearer I have placed before you to-night curves of the efficiency of a steam-driven dynamo at various loads, from which you will see that the quantity of water required to be evaporated per unit working at 20 per cent of its load is more than twice as much as when it is fully loaded, the figures being 33 pounds of water per unit at full load and 73 at one-fifth load.

NON-CONDENSING WILLANS SET.

Engine Load Factor.	Lb. of Coal per Unit.	Cost per Unit of Coal at 20s. per Ton.
20 per cent.	7.3	.78*d.*
30 "	5.4	.57*d.*
40 "	4.75	.5*d.*
50 "	4.3	.46*d.*
60 "	4	.43*d.*
70 "	3.75	.4*d.*
80 "	3.5	.37*d.*
90 "	3.4	.36*d.*
100 "	3.3	.35*d.*

Similar engines, when dealing with the business of supply, have been tested by Professor Kennedy at actual work, and he has been good enough to publish his results. These results I have embodied in a table, to which I shall refer you, and I have amplified them somewhat so as to give us sounder ideas of what the figures actually mean by attaching a value to the ton of coal. This value may appear high to you in this district, but it is the price that rules in London, where at the moment there is a greater production of electrical energy for lighting purposes than in all the rest of the United Kingdom put together. Moreover it is a comparatively easy matter to mentally reduce the figures of the table based on a standard price of 20*s.* per ton to the figure which rules in each investigator's district.

KENNEDY TABLE OF CONSUMPTION ON VARIABLE LOADS.

	11 a.m. to 6 p.m.	6 p.m. to midnight.	Midnight to 11 a.m.	Whole day.
Time.....	7 hrs.	6 hrs.	11 hrs.	24 hrs.
Total i.h.p. hrs.....	562	1,366	407	2,235
Total e.h.p. hrs.....	400	979	260	1,639
Units generated....	293	731	193	1,217
Coal consumed...	3,838 lbs.	4,459	2,547	10,844
Coal per unit.....	13.1 lbs.	6.1	13.2	7.33
Coal at 20*s.* per ton..	1.4*d.*	.65*d.*	1.41*d.*	8*d.*

Take as an example of the use of table 1 that we have 100 unit, steam dynamo running at maximum efficiency. It will need under the most perfect conditions of running 3.3 pounds of coal per unit per hour, or 330 pounds. Increase the load upon our station 20 per cent and we have to start another similar set, so that the load is divided between them. Each set is now working at 60 per cent load factor; the amount of coal consumed is four pounds per unit, or 480 pounds. Thus an increase of 20 per cent in the load involves an increase of 45 per cent in the coal consumption, and the actual loss owing to the decrease in efficiency is 9½*d.* per hour in the coal bill alone as long as the 20 per cent extra load is maintained.

(To be continued.)

Improved Electric Elevators.

The well-equipped manufacturing house, Sulzer-Vogt Machine Company, of Louisville, Ky., is now offering to the public new and improved electric elevators. Two forms, passenger and freight, are shown on this page. This class of elevators, as our readers all know, long since ceased to be an experiment, and they are now considered the most economical, not only in cost of running, but in space occupied and convenience. The electric hoisting machine built by this company is of the worm gear class, and is provided with safety appliances and controlling device, which are in every way effective and yet simple, the result of long experience and an intelligent understanding of requirements. The winding drum, gearing, motor and controlling apparatus are all mounted on one heavy cast-iron bed plate. The worm and worm shaft are turned from one solid steel forging. The worm gear is of the best anti-friction bronze, accurately turned and cut by machine made for this special purpose, and is enclosed with the worm in a cast-iron case and run in oil, which insures perfect lubrication and smooth running. The drum is of an extra quality of cast-iron, of large diameter, turned and grooved in the lathe for the requisite number of lifting cables, and is bolted directly to the worm wheel in the most substantial manner. The brake wheel is keyed rigidly to the worm shaft, special care being taken to secure strength as well as smooth working in all parts of the brake apparatus. Both the brake lever and switch are operated by the operating cable in the hatchway or the lever device in the car. Their movements are so timed that the instant the electric current is switched in the motor the brake is released, and the instant the current is shut off the brake is applied.

The motor is of the multipolar type, slow speed, long bearings, self-oiling brass boxes and self-adjusting carbon brushes, which require the minimum attention. It is constructed especially for elevator work, having great starting power and durability. It has proven its fitness for this class of work and its thorough reliability on the number of elevators this progressive company has erected. It has a large margin of power and regulates itself automatically.

The Sulzer-Vogt company is doing a large business, and recently issued a complete special electric elevator catalogue, which will be sent to all interested who will write to Louisville for it.

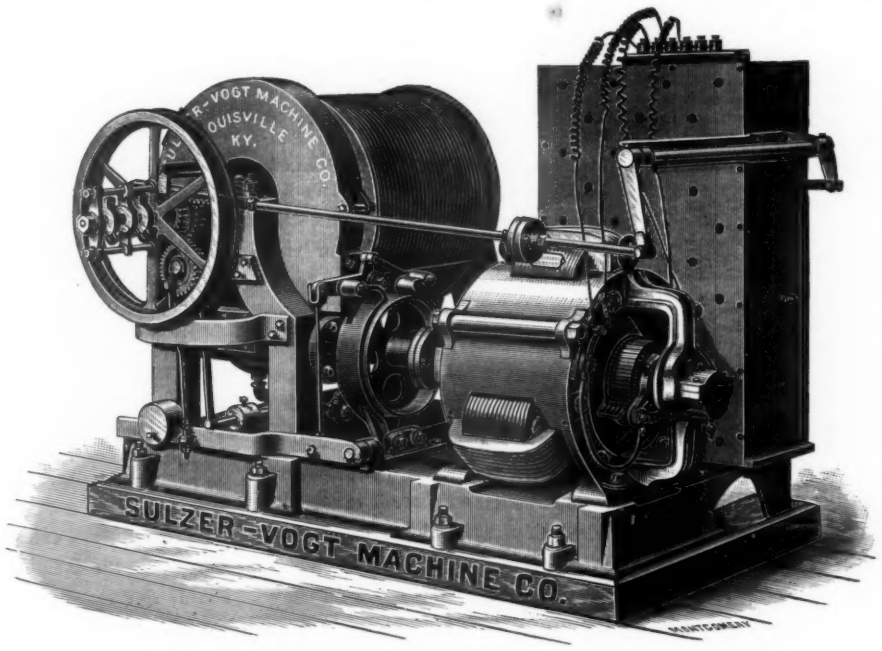

FIG. 1.—IMPROVED ELECTRIC ELEVATOR.—FREIGHT HOISTING MACHINE.

A Three-Phase Railway System.

The first application of the three-phase long-distance system to street railway work will be made by the General Electric Company at Lowell, Mass., where a plant is in course of construction for the Lowell and Suburban Street Railway Company. Its special features will render it one of the most interesting three-phase installations ever effected.

In the first place, the generators will deliver both alternating and continuous current, and when not in use for transmission work will be run in parallel with the railway generators now in the station. They will be wound for delivery of low voltage current at the alternating side, and this current, raised to 5,000 volts, will be carried to two sub-stations, one nine miles and the other 14 miles distant from the generating station.

The sub-stations will each be provided with suitable step-down transformers of the General Electric air-blast type, as well as two rotary converters. These machines are constructed to maintain at the commutator brushes a voltage of 5,000 volts at no load and 550 volts full load. Another transformer sub-station for 400 incandescent lamps will be installed six miles from the generators.

The success of this plant will go far towards solving the problem of the operation of railways over long distances, taking the current from the one power station.

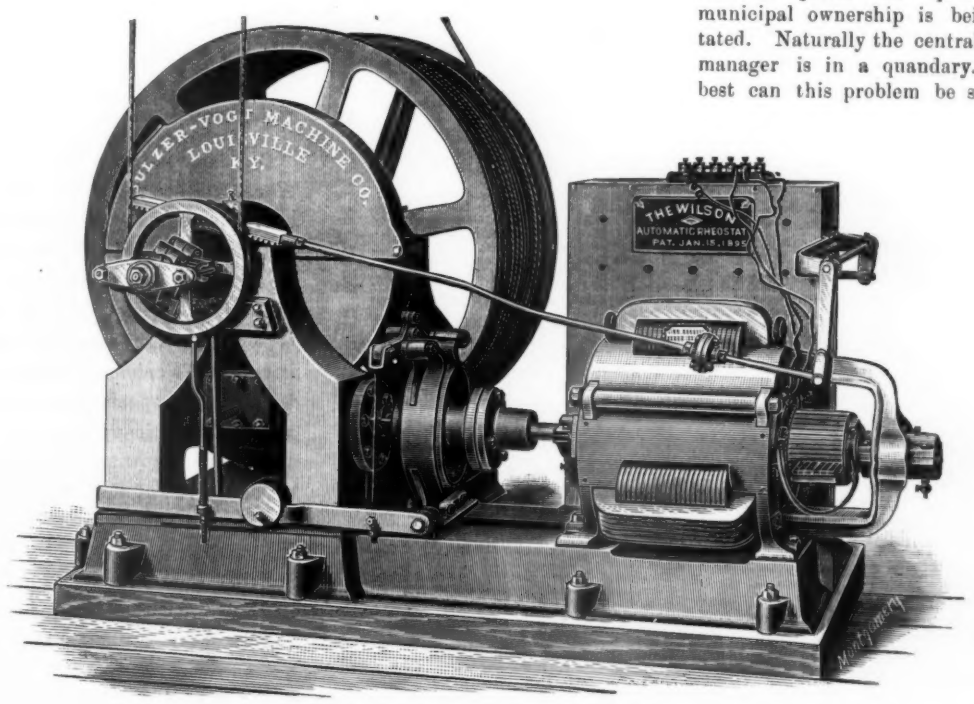

FIG. 2.—PASSENGER HOISTING MACHINE.

ELECTRIC LIGHTING NEWS.

The Wyckoff Harvester Works, at Falconer, N. Y., will be equipped with electric lights, if some good electric light salesman will happen along soon.

The Richmond, Ind., Automatic Light Company has elected the following officers:

H. F. Warren, president; Seth F. Watson, vice-president; Jos. M. Gibson, secretary; Valentine Leonard, treasurer; George F. Baker, general manager and superintendent.

At Alameda, Cal., a local paper gravely states that the city has not yet received any revenue from its incandescent lamps, though customers have been using them for some time, but that City Trustee Clark has engaged a bookkeeper to open a set of books and *make out bills*. It would seem best to make out bills before collecting them.

The city of Keokuk, Ia., authorizes the council to erect a municipal electric lighting plant and make a contract for the development of the great natural water power of the Mississippi at that point. By the terms of the contract the Des Moines Rapids Power Company must be ready within a year to furnish not less than 15,000 electrical horse-power, involving an expenditure of half a million.

Many municipalities have determined to pay a lower rate for street lighting during the coming fiscal year, and where the local lighting company has refused to accept the lessened price, the question of municipal ownership is being agitated. Naturally the central station manager is in a quandary. How best can this problem be solved is the question of the hour. One solution offered by Mr. D. P. Perry, of the Standard Electric Company, of Chicago, is certainly worthy of thoughtful consideration. For a saving in operating expenses of two per cent per lamp per night aggregates quite a sum in the course of a year, and this saving judiciously handled will enable a better financial showing to be made even though a smaller price for street lighting is accepted.

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SPECIAL NOTICE TO ADVERTISERS.

CHANGES for advertisements must be in this office by Friday noon for the following week's issue. NEW ADVERTISEMENTS should be in the office not later than Saturday noon to insure publication the following week.

NEW YORK, JUNE 12, 1895.

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Will New York's Mayor appoint two electrical engineers as Commissioners of the Subway Board? We hope so, for the Mayor is an experienced electrical official, but we have our misgivings.

An electric railway is to be constructed in Montmarte, Paris. It was originally proposed to build a cable road, but wisely abandoned after a commission examined several electric conduit systems, notably those in Buda Pesth and Washington. The fare on the railway will be two cents, except during the hours when workingmen go to and from their work, when it will be reduced to one cent. The road is to be equipped with electrical apparatus constructed in France. This will be the cheapest fare on any electric road, we believe, in Europe.

Steadily there is an improvement in the financial situation in the electrical industry. The struggle is not over, but courage and carefulness are the chief aids to be relied upon for the full return of profitable business. Many have been too sanguine over the profit-producing abilities of the electrical field in the past and were unfortunate sufferers during the depression now gradually receding from view, we hope never to return. Be careful in your accounts, keeping such risks to the extreme minimum, and have the courage to ask a reasonable profit on goods of first-class quality and make no other. You will then deserve and win success.

Our spurty little contemporary, *Electricity*, is evidently tired. Its efforts to regulate the universe have wofully failed. It has commenced to scold and whine over lack of appreciation. It started out to kill the General Electric Company, the American Bell Telephone Company and a few other companies (non-patrons), and is sorely chagrined to find them alive and growing in strength; besides, a few of its slow-going contemporaries were to be driven off of the face of the earth, and numerous individuals were ground to pieces by its disjointed pen (in its mind). Several electro-medical schemers and quacks were "exposed"—and are doing a bigger business now than before, which we all regret. These little disappointments often happen to infantile journalism. We shall miss our erratic and ill-advised, but seldom dull, little half-brother, if it is going to give up the fight and retire from a cruel and unappreciative field. Perhaps, however, its cries of disappointment mean the beginning of its own reform—although this thought requires an unparalleled stretch of the imagination.

STREET RAILWAY MAIL SERVICE.

Among the many boons brought to our present civilization by the introduction of the trolley, one that is receiving the most cordial welcome is the electric mail car. In all the leading cities the street railway mail car is rapidly becoming a fixture. We believe St. Louis has the honor of being the first to adopt this method of forwarding mail on an extensive scale.

Chief Clerk Rice, of the Railway Mail Service at Boston, is quoted as saying last week:

To-day practically all stations of the Boston Post Office, heretofore supplied by wagons, depend upon electric car service exclusively. Except to Charlestown, Chelsea and East Boston all the wagons have been discontinued. Neither the department nor West End officials anticipate any trouble as a result of general order 236, providing for carrying closed mail packages on front platform of electric cars, under care of motorman.

STRAINING FOR FAVOR.

If our daily—and *weakly*—contemporary, the New York *Recorder*, would devote its energies to the honest treatment of progressive movements of the day, instead of fanatically refusing to see any good, only evil, in that latter-day invention, the trolley car, it might yet win a standing in metropolitan journalism. About the only excuse this jumble of a newspaper has for an existence is "Howard's column." Its ravings about the trolley, exaggerations of accidents—sad and terrible enough at all times as they are—and refusal too see any good whatever in the efforts of railway men to improve their systems and diminish risks, have won for it an unenviable and losing position in New York newspaperdom that is every day becoming more apparent. Where there is power there is danger, and power is necessary in the movement of electric cars. There is not a street railroad man in Brooklyn or elsewhere but what stands ready to adopt any fender if convinced that it will do what they have all so far failed to do—prevent the loss of life and limb on the part of persons who, through carelessness or ignorance, get in the way of the moving trolley cars. Some of the Brooklyn roads—not all—have been badly managed and far too many accidents have resulted. These have become fewer in number and God speed the day when we shall never again hear of a death by an electric car.

There are always two sides to be considered in journalistic discussion of such events—so far the paper mentioned has seen only one. It should remove its blind bridle and be honest and fair.

Wall Street and the Electrical Stock Market.

The early part of the week in Wall street chronicled higher prices for industrial shares and the later days a substantial reaction, under influence of a combination of bear factors, among them some London selling, higher sterling exchange rates, a reduction in the Northwest dividend of 1 per cent, a receiver for the United States Cordage Company, pronounced weakness in New York, Susquehanna & Western, and general uneasiness among holders of insolvent railroad stocks caused by the certainty that Erie will be heavily assessed in the second reorganization which is rendered necessary because the first was not sufficiently drastic. On Friday, when it looked as if the market was going to pieces, the government bond syndicate stepped in, checked the decline and started the movement toward higher prices. Trade reports are extremely favorable and point to a rapid improvement in business.

General Electric is once more coming prominently to the front as a speculative medium. That that stock is being worked by a clique of insiders there is no longer any question of doubt. On Monday the price was marked up sharply and the buying was accompanied by reports that the negotiation between General Electric and Westinghouse had been resumed, and that this time they would be successfully consummated. On Tuesday the stock touched 37⅜, an advance of 2¼ for Monday. This was evidently too rapid to suit the promoters of the deal. A reaction was ordered, and to bring it about organs of the clique put out statements to the effect that the negotiations had a second time been abandoned. The stock promptly declined. After it again touches 33 or 34, and opportunity has been afforded to buy more stock, there is no question that it will again advance to the tune of "Negotiations resumed."

The early reports were to the effect that not only was a general deal between the two great companies contemplated, but that a much more comprehensive scheme was proposed by Messrs. Belmont and Morgan, which would take in the leading electric manufacturers of the country. The recent development in the affairs of Westinghouse, including its new plant at Brinton and its control of the Tesla multiphase patents, renders it a very formidable competitor.

Considerable disappointment was manifested this week over the failure of the United States Supreme Court to decide the celebrated McKeesport case before adjournment for the Summer. It is generally understood that the failure was due to the fact that the record of the case was too voluminous for the court to get through with it before adjournment.

Edison Electric Illuminating of New York sold 101 on Tuesday, and the later trading between 99 and par. The 5 per cent bonds were more than ordinarily active, touching 109⅜ on Monday. This is the recent highest price. The demand was in a measure due to the heavy subscription of a block of consolidated bonds offered for sale last week as was set forth in this column.

Paine, Webber & Company, of Boston, offer at 102 and interest $165,000 of first consolidated mortgage 5 per cent bonds of Electric Light Company, of Boston. They are a part of an issue of $1,250,000, which can be used only for new construction, and with the exception of $300,000 bonds which mature in 1898 and to pay which an equal amount of the consolidated issue is reserved, they are a first lien upon the property.

The Commercial Cable Company declared the regular quarterly dividend of 1¾ per cent payable July 1 to stock of record June 22. Books reopen July 1. The stock sold on the New York Stock Exchange Friday at 162, an advance over previous sales of 2 points.

A committee headed by F. P. Olcott, of the Central Trust Company, has brought out a plan for the reorganization of the Milwaukee Street Railway Company. New 5 per cent bonds to the amount of $7,000,000, preferred stock to amount of $4,500,000 and common stock to amount of $3,500,000, will be issued. Holders of an old consolidated mortgage bond get $617.56 of new bonds and $382.44 of new preferred stock. Unfounded coupons get par of the new preferred. The last coupon secures 61.756 per cent in cash. The second mortgage gets double its par value of common stock, and two divisional mortgages, aggregating $1,500,000, are left undisturbed.

On the Boston Exchange, Bell Telephone was very quiet and declined 1 point to 201. Erie Telephone was steady at 57 and New England Telephone quiet between 72 and 72½. Electric storage battery was featureless between 27 and 28. Westinghouse securities were quiet, as usual, the common was quoted at 32½ to 33½ and the preferred at 52 to 53.

There has been a short improvement in the various telephone and other electrical properties in a month. A table of leading issues showing prices June 1 and May 1 follows:

	June 1.		May 1.	
	Bid.	Asked.	Bid.	Asked.
Bell Telephone	202	202¾	189	190
American Telephone	3½	....	2½	....
Bell Telephone of M'x	175	185	175	185
Central Union	50	52	....	49½
Chesapeake & Potomac	59	60¼	51	54¾
Chicago Telephone	166	175	150	....
Cumberland Tel.	45	47	49	50
Hudson River	38	42	38	42
Mexican	70¢	75¢	75¢	$1
New York & New Jersey	105	107	99	100½
Pennsylvania	87	50	87	50
Providence	94	95¾	91	92
American District Tel.	30	40	30	40
Cent. & S. Am. Cable	118	120	119	121
Commercial Cable	160	162	142	
Boston Electric Light	108	....	107	107½
Bridgeport Elec. Light	32½	35	30	37½
Col. El. Lt., (Portland)	8½	9	9	9¼
Edison Ill., Brooklyn	102½	103½	102¼	103½
Fort Wayne Electric	1¾	2	1¾	2
Hartford Elec. Light	101	107	95	....
Lowell Electric Light	91	94	....	....
New Haven Elec. Light	147	....	147	....
Narragansett Electric	81¼	82	80¾	82
Salem Electric	101	105	105	110

Interior Conduit and Insulation Company has declared a dividend of 1½ per cent payable July 15. Books close July 1 and reopen July 16. During the first five months of 1895 the company shows a profit, which, if added to the estimated profits for June, will aggregate $40,000 applicable to dividends. BAIN.

New York, June 8, 1895.

PERSONAL.

Col. Gardiner C. Sims, of Providence, honored several of his New York friends with a call last week, but not all of them.

Mr. Charles M. Morse, a Buffalonian, called on his metropolitan friends last week. Mr. Morse is one of the leading engineers of the State and takes an active interest in all electrical progress.

Mr. J. Chester Chamberlain, the able young electrical engineer, is to be married to-day to Miss Anna Mary Irwin, of Albany. The ELECTRICAL REVIEW cordially wishes the bride and groom all happiness.

Mr. W. C. McKinlock, the accommodating secretary of the Metropolitan Electric Company, Chicago, has returned from a southern business trip, where he secured some profitable orders and reports a decided improvement in business.

The contract for the electric launches for the lakes at the Cotton States and International Exposition has been let to Gen. C. H. Barney, of New York. The launches will be made of cedar, with oak frames and mahogany decks. Seven Venetian gondolas and one Venetian state barge will also be placed upon the lakes. These lakes, surrounded by terraces covered with running honeysuckle, and illumined at night by thousands of electric lights, will be one of the most beautiful features of the Fair, and the electric launches and gondolas will afford a quick means of transit from one part of the grounds to another. Around the margin of the lakes, at vantage points, will be the landings.

An Electrical Question.

The question, Does electricity kill? must not be allowed to remain an open one.—*New York Evening Telegram.*

New Use of Storage Batteries.

The Electric Storage Battery Company, of Philadelphia, has closed a contract for a storage battery plant in connection with the Sprague electric elevator system. The plant will be installed in the new public buildings of Minneapolis and will operate 12 elevators. This is a new field for the storage battery industry.

Street Railway Earnings.

The Columbus Street Railroad reports gross earnings for May of $55,077, an increase of $5,710 as compared with the same month of last year, and net $28,098, an increase of $1,787. For the 11 months ending May 31 the gross earnings were $239,101, an increase of $25,152 as compared with the corresponding period of last year, and net $115,953, an increase of $8,995. Fixed charges were $74,820, leaving a surplus of $41,133, an increase of $7,680.

Foliage vs. Light.

Middletown, Conn., is having trouble with its electric light. The difficulty arises from the dense foliage of trees in the vicinity of the lights, which precludes the rays from lighting the streets properly. A proposition will be made to trim the shade trees in the vicinity of the lights so that better results will be possible. There is likely to be a strong objection on the part of property owners who take pride in the appearance of their shade trees. On the other hand, it is claimed that the trees will not be injured in the least, but that the benefits will be great.

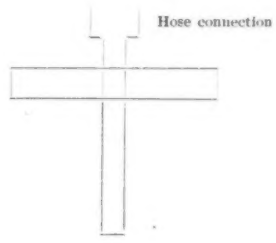
How to Plant Telephone Poles in Frozen Earth.

TO THE EDITOR OF ELECTRICAL REVIEW:

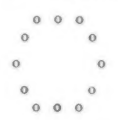
I am doing something here in the way of digging holes for poles which I believe is an entirely new departure from anything ever previously attempted in that line.

We have about three feet of frost, which is generally looked upon as a great obstacle to line building at reasonable cost. I have demonstrated that it is not only a bugbear, but that frost is an actual benefit and of genuine assistance to rapid work.

I am using steam in a special way. I have a portable boiler which I keep steamed up to about 60 pounds. I have, say, 15 feet of two-inch hose attached to it. On the other end of the hose I have about five feet of one-inch gas pipe, with a cross-piece at the point where the gas pipe is coupled to the hose. The object of this cross-piece is to give the men a handle to work with. The appearance is like this:



There is a full one-inch outlet at the bottom of the pipe. We mark out the circumference of the hole with a spade and then apply the steam pipe directly to the ground. It walks through the frozen ground like pushing a "tryer" into a cheese. We drill a series of these holes about two inches apart in a circle like this:



Then we take a digging bar and cut away the ground between the holes, which has been somewhat softened by the steaming process, and with a pair of ice tongs we lift out a core of frozen ground equal to the depth of the frost, after which we finish the hole in the usual way.

The frost is an advantage for the reason that the walls of the hole are solid, and "caving in" is obviated. In a sandy soil this is as much of an objection as is the frost. I have dug 30 holes from five and a half to seven feet deep in eight hours with four men by this method, encountering the usual delays and loss of time always present in such work on streets in cities and villages.

On straight-away line work, with such soil as we have here, I believe we could finish 50 holes in 10 hours with the same force. This is as much as I have ever known to have been done in Summer time with the most favorable weather.

It is certainly a great and very successful scheme to overcome one of the greatest objections to building lines in the Winter.

PAUL W. BOSSART.

Winona, Wis., March 4, 1895.

Electric Headlights.

Considerable progress has been made in the West with electric headlights for locomotives, and Mr. G. C. Pyle, of Indianapolis, who has been identified with this work, has just brought out an improved combination for this service, in which the mechanism is simplified and the wear consequently reduced. These generators are customarily mounted on the top of the smoke box, behind the headlight projector, and either before or behind the stack. The dynamo is driven by a compound steam turbine of high speed, and the apparatus is described as follows:

The steam is expanded four times before it is exhausted into the atmosphere. The governor is on the turbine wheel. Dynamo and turbine are on one base plate, which is attached to the engine in such a manner as to preserve the alignment. The armature and commutator, which weigh but 23 pounds, are on the engine shaft, which runs at 2,000 revolutions per minute. The electrical balance of the dynamo is said to be so perfect that no spark can be seen at the brushes. The electric lamp can be placed in any ordinary headlight reflector by removing the oil lamp. Only one carbon is employed, a short piece of copper being used for the negative electrode. The entire plant is 19 inches long and weighs 211 pounds, the weight of the lamp being 15 pounds. The only wearing surface is the shaft, and this runs in oil. The two bearings are three and a half and six and a half inches long, and the weight of shaft, armature and turbine wheel is but 40 pounds. As there are no internal wearing parts requiring oil, it is not considered necessary to supply a sight-feed lubricator in the cab for the dynamo. One five-eighths-inch carbon, costing one and a quarter cents, will run about eight hours, which, it is claimed, practically constitutes the expense of running the light for that length of time. Among the claims made for the device are that in operating the plant dry or wet steam may be used, and it is said to make no difference if a full head of high-pressure steam is suddenly turned on, as there can be no reaction or backlash. The whole mechanism may be started with one turn of a half-inch valve.

Three-Phase Installations of the General Electric Company.

An interesting power transmission plant is in course of installation at Bayonne, N. J., where the three-phase system of the General Electric Company will be employed to operate the machinery of the Tide Water Oil Company. This company is one of the Standard Oil Company's interests and is engaged in exporting the refined products of petroleum. The nature of the process is such that spark-proof apparatus is an imperative necessity, and multiphase apparatus was selected as the only machinery which could meet the peculiar conditions.

The generator will be a 550-volt three-phase machine having eight poles and a capacity of 75 kilowatts. The several induction motors will be of 5, 10 and 15 horse-power. Some of these are spark-proof, and have a permanent resistance in the armature circuit. A special interest attaches to these, as they will be employed in places where there exists an ever present danger of explosion from gases, which a spark could really ignite. They will be used to operate pumps, elevators and other machinery. The switches will be of special construction, their blades immersed in oil.

The generator also supplies current for about 525 lights scattered throughout the different parts of the works. Regulation of the lighting circuits will be effected by special revolving regulators of novel design.

The Oakland Gas and Electric Company, of Oakland, Cal., will also use a three-phase transmission plant for general power work. Current to a number of induction motors, ranging from one to 15 horse-power, will be supplied from a 75-kilowatt three-phase machine, and there will be extensive lighting in connection with the plant. The generator's current, at 2,000 volts, will be reduced at two centers of distribution to the necessary potential and the secondary network will cover a territory of 1,200 feet in every direction from both centers. From these points pressure wires will be run back to the power house and the voltage will be there controlled by potential regulators.

A plan somewhat similar will be followed by the Fall River Electric Company, of Fall River, Mass., but, instead of three-phase, monocyclic apparatus will be used. Two 75-kilowatt generators will be used and the output will be used for lighting purposes during the dark hours, supplying current during the day for general power work. The motors will be of the General Electric induction type, ranging from one to 10 horse-power and will be wound for 110 volts, to which pressure the current generated at 2,000 volts will be reduced.

Wanted—An Electric Carriage.

A western firm writes us as follows:

We are on a still hunt for some means of vehicle locomotion to replace the horse. We regret to say that our quest has been unsuccessful. Our impression is that what we are seeking is still somewhat crude and that it has progressed in this country much less than in France. We enclose herewith stamped envelope, self-addressed and beg that you will spare a small portion of your time to give us a reply and cite us to some person or concern who will either provide us information in this direction or supply us with the vehicle we wish. We know very well that the future must develop to a pronounced success something of this sort and it is only a question of time when we shall see things as wonderful in an electrical way as we have heretofore.

Will our electrical inventors please rise to the occasion?

It is reported that a new electric lighting and power company is being organized in Indianapolis, Ind., in which such men as R. T. McDonald, T. H. McLain, R. C. Light, Thos. Taggart, Leon O. Bailey and others are interested, and that big contracts are to be had if the organization is perfected.

ELECTRICITY AND THE GRANGERS.

THE FIRST FRENCH ELECTRICAL FARMING INSTALLATION.

Although we have heard a great deal about the practical applicability of the electric current to farming purposes, and persons gifted with prophetic minds have predicted the approach of the day when farming will be a "gentlemanish" sport, the obedient servant, "electricity," doing all the chores, this beautiful vision has so far failed to materialize and now, as at the times of the Chaldeans, the bulk of all modern farmwork is carried on by human power. Now, as in the times of yore, it is true that "In the sweat of thy face shalt thou eat bread till thou return unto the ground," etc.

Is that ancient dictum likely to be superseded? That was the question which Mr. F. Prat, a wealthy gentleman, who owns a farm in Tarn, France, has undertaken to solve, and from such data as have recently been published in the *Génie Civil*, it would seem as if the sternness of the Divine dictum would soon be a thing of the past. M. Prat, being desirous to do the entire farm work by electric power, divided his estate longitudinally into two nearly equal sections, erecting on the line of demarcation posts for the attachment of a feed wire. Having at his disposal a waterfall, capable of driving a 30 horse-power turbine, he employed this machine to drive a dynamo generating 40 amperes under a tension of 375 volts. The above mentioned line extends 1,800 metres. The plow is moved by a windlass operated by a motor (40 amperes, 375 volts). In turn, the windlass has two drums; upon one the hauling rope of the plow is wound, from the other it is reeled off. The windlass rests upon rollers which glide on iron rails, laid directly on the ground and must be deplaced or moved whenever five furrows have been plowed.

Two cables, each 200 metres long, connect the main line with the motor. They are wound on a drum, carried on a windlass. The drum can be revolved manually by a crank. The attachment of the cables to the air line is made simply by means of bronze jaws or clamps. A few minutes suffice for making any desired change, and, as a rule, such change is needed every third day. As the traction cable of the plough is 250 metres long, it permits the ploughing of 250 metres on both sides of the aerial conductor, or a surface of $1,800 \times 800 = .44$ hectares (one acre = 0 4047 hectares). This—as far as we know—the first French farming electrical plant, has not been installed for experimental purposes, *i. e.*, as a temporary device; on the contrary, it is a permanent investment, destined to carry on all the various farming operations, such as threshing, mowing, straw cutting, churning, etc. For this purpose M. Prat has equipped the farm with electromotors to drive the various auxiliary farming machineries.

At the time the first trials took place, the soil, on account of snow and rain, was in a very bad condition. The soil consists mostly of clay. Nevertheless the plow made furrows 0.65 metre deep and 0.50 metre wide, advancing 26.50 metres per minute, or ploughing half a hectare per day, a highly satisfactory result.

The electrical plant is also utilized to light the Manor House and the principal roads. V. M. B.

MISCELLANEOUS ELECTRICAL NEWS.

The Sing Sing Electric Light Company have increased the capacity of their plant by the addition of another big Westinghouse engine.

The contract for putting in two new electric elevators and repairing two old ones in the New York Post Office building has been awarded to Otis Brothers, New York, at $25,450.

At Brussels in announcing a sale of old insulators a new use for them is suggested. It is remarked that they "will be sold *en masse* or in lots, and they can advantageously be utilized as borders for gardens."

The mechanical genius of Mr. George Westinghouse has made the new shops of his electric manufacturing company, near Pittsburgh, the model organization of the kind in this country, and probably it is not equaled in any country on the globe.

The great new central station of the United Electric Light and Power Company, New York, is rapidly approaching completion. The alternating system will be used entirely, the apparatus being of the Tesla type, supplied by the Westinghouse company.

Mr. Fred Merrihew, aged 28 years, son of General Superintendent Merrihew, of the Western Union Telegraph Company, died June 1 of appendicitis. Mr. Merrihew was a rising young man and his family will receive the sympathy of all friends over their sad bereavement.

Mr. A. H. Chadbourne, of the United States Telephone Construction Company, Philadelphia, was a New York visitor last week and reports the telephone field the most active one of his acquaintance. The demand for his new "M. & B." transmitter is very large.

The electricians of Brooklyn, N. Y., have formed an organization designed to protect the interests of employers of electrical workers. The association will be known as the Electrical Contractors' Association of Brooklyn. At a meeting of the organization, held at No. 370 Pearl street, Brooklyn, 28 members were enrolled, and the following officers to serve for one year were elected by unanimous vote: President, Peter D. Myers; vice-president, William H. Dean; secretary, William H. Pearson; treasurer, George J. Soper.

ELECTRIC RAILWAY NOTES.

The street railways of Washington have been ordered by the commissioners to equip their cars with suitable fenders at once.

The contemplated consolidation of the Sandusky, Milan & Warwork with the People's Electric Road, of Sandusky, O., has been abandoned.

The Woonsocket Street Railway Company will begin work at once on the extension of their lines to Manville. About five miles of track will be equipped.

The Newburg & Walden electric road is now completed, and the first car, containing a large party of city officials and newspaper men, made a trip over the line a few days ago.

The West End road in Boston is trying the experiment of breaking joints in some of their new track construction, as a means of saving the rails, and have found it a decided improvement.

Cleveland, O., is falling into line on the matter of a street railway mail service, and the prospects are favorable for its early adoption. Both the post office authorities and the people are in favor of the plan.

Rapid transit in Detroit, Mich., was given a substantial boost by the Common Council a few days since in granting the franchises asked for, and the citizens feel that their pet project is nearer fulfillment than ever before.

The proposed electric road through the Fox River valley promises to open up one of the most delightful residential sections in the neighborhood of Chicago, and will add greatly to the value of property through the entire section.

The officials of the Street Railway Company, of Rochester, N. Y., are testing the new Lacey truck on one of their cars. It is designed expressly to overcome the very disagreeable feature of oscillation which is so common where short trucks are used.

The Waterport Electric Light, Power and Railroad Company, of Waterport, N. Y., has commenced the construction of a storage battery railway, connecting Batavia with Lake Ontario. The cars will run on an elevated track using a single rail.

An experiment in the use of compressed air for motive power in street railways will soon take place in Baltimore, it being claimed that a car can be charged in a half minute to run 15 miles. Two cars are being equipped for experimental purposes and will be ready within a few weeks.

Extensive improvements are under way on the lines of the Troy City Railway Company, and important extensions of the system have been decided on. Rails, wire and ties have been purchased for the line between Albia and Averill, and it is thought the road will be completed within the next three months.

The People's Passenger Railway Company, of Philadelphia, have agreed to pay the city about $70,000 for the paving and repairing of the streets occupied by their tracks. A plan is also on foot to utilize this road for carrying the mails, it being well adapted to this purpose, reaching easily 11 stations and sub-stations as well as the central office.

The New Jersey Electric Railway Company has arranged with the North Hudson railway for a system of transfers by which passengers may be transferred without extra charge to practically any part of Hudson County. The cars running between Rutherford and Hoboken are to be equipped with two 40 horse-power motors, and will be capable of a speed of 30 miles an hour. The run from Paterson to the Hudson River will be made in one hour and twenty minutes, and the fare will be 20 cents.

Another act of vandalism in the cutting of trolley wires is reported from Bridgeport, and, as in a former instance of a similar nature, is attributed to the officials of the Consolidated road. Wires of the Bridgeport Traction Company passing under the Fairfield Avenue Bridge were demolished and left in a dangerous condition within two hours after being put up. The bridge, which is the property of the Consolidated, was amply protected by an iron trough through which the wires passed, and no opposition to placing them there was looked for. When a corporation of the size of the Consolidated stoops to wire cutting, they must be sore indeed.

The fight between Mrs. Washington Roebling, of Trenton, N. J., and the Trenton Passenger Railway has been settled for good by a decision of the Supreme Court. Mrs. Roebling fought the company for wanting to put up iron poles in front of her house on West State street. While the company were digging a hole in which to place the pole Mrs. Roebling appeared and stopped the work. She guarded the front of her house all night and went to law over the matter. She was successful in preventing the company from erecting the pole at first, but the decision of the Supreme Court is against her, and the company will now put up the pole.

It is Being Introduced Here.

To the Editor of Electrical Review:

In your issue of May 22, you publish an excellent picture of the improved desk set of the Mutual Automatic Telephone Company, of New York. We suppose that this company does not claim to have designed this desk set, as it is the property and invention of Messrs. L. M. Ericsson & Company of Stockholm, Sweden, whose telephonic apparatus are well known over the whole world and sold through us in very large quantities in the Republic of Mexico. We enclose a design of the Ericsson telephone, taken out of their catalogue, which you will find is exactly the same as per picture in your aforementioned issue.

Yours truly,

SEEGER, GUERNSEY & COMPANY.

Mexico, May 29.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.

PRELIMINARY PROGRAMME NIAGARA FALLS MEETING, JUNE 25 TO 28, 1895.

To the Editor of Electrical Review:

The general meeting of the Institute will be held at the Cataract House, Niagara Falls, N. Y., beginning on Tuesday, June 25, at 10 A.M., and continuing four days. The following papers will be presented:

1. "The Substitution of Electricity for Steam in Railway Practice" (inaugural address), by the president, Dr. Louis Duncan, of Baltimore.

2. "Properties of Fuse Metals When Subjected to Short Circuits," by Walter E. Harrington, of Camden, N. J.

3. "Location of Grounds in Armatures, Fields, Etc.," by Clarence E. Gifford, of Jamestown, N. Y.

4. "Some Features of Alternating Current Systems," by Charles P. Steinmetz, of Schenectady, N. Y.

5. "Theory of General Alternating Current Transformer," by Chas. P. Steinmetz, of Schenectady, N. Y.

6. "Compounding Dynamos by Armature Reaction," by Elihu Thomson, of Lynn, Mass.

7. "Existing Commercial Applications of Electrical Power from Niagara Falls," by W. L. R. Emmet, of Schenectady, N. Y.

8. "Alternating Current Curves," by Dr. C. E. Emery, of New York.

9. "Electric Power in Factories," by Prof. Francis B. Crocker, Messrs. Benedict and Ormsbee of New York.

10. "Some Observations on a Direct-Connected 300-Kilowatt Monocyclic Alternator," by Profs. Dugald C. Jackson and S. B. Fortenbaugh, of Madison, Wis.

11. "On Mechanical Models of the Electric Current," by Prof. Brown Ayres, of New Orleans, La.

12. "On the Cause of Death in Electric Shock," by Albert M. Bleile, M. D., of Columbus, O.

13. "Long-Distance Power Transmission at 10,000 Volts" (the Pomona plant), by George Herbert Winslow, of Pittsburgh.

14. "Notes on the Reconstruction of a Small Central Station Plant," by Franklin Leonard Pope, of Great Barrington, Mass.

15. "On Rating the Performance of Electric Power Plants and Transmission of Varying Loads," by Prof. Wm. S. Aldrich, of Morgantown, W. Va.

16. "Work of the Westinghouse Electric and Manufacturing Company for the Cataract Construction Company, of New York," by L. B. Stillwell, of Pittsburgh.

Among the objects of engineering interest which it is proposed to visit are the new works of the Niagara Falls Power Company, the Niagara Falls Park and River Railway on the Canadian side, the aluminum plant of the Pittsburgh Reduction Company, the plant of the Carborundum company, the central station of the Niagara Falls and Buffalo Electric Light and Power Company.

The date of this meeting has been fixed with a view to accommodating all who may wish to visit the Falls during the most desirable season. Members are requested to invite their friends, either ladies or gentlemen. Should a sufficient number of favorable responses be received upon the reply card herewith, reduced railway rates may be secured. The hotel rate will be three dollars per day and upwards, according to room, at the Cataract House. Those who prefer will find the International convenient.

The convention rate of one and one-third fare for the trip has been granted by the Trunk Line Association, conditional upon an attendance of 100 members and guests. This covers the Grand Trunk (in part), New York Central & Hudson River Railroad, West Shore, New York, Ontario & Western, Erie, Delaware, Lackawanna & Western, Lehigh Valley Railroad, Central Railroad of New Jersey, Philadelphia & Reading, Baltimore & Ohio, Chesapeake & Ohio, Pennsylvania, and other minor lines. Similar concessions are expected from other lines, east, south and west, the above covering only the territory east of Niagara and north of Pittsburgh, except New England.

1. Buy an ordinary ticket and secure from ticket agent a certificate of purchase. Ample time should be allowed for this purpose.

2. This certificate, endorsed at the meeting, will secure a rebate of two-thirds fare returning over the going route, without stop over.

3. Tickets can only be bought three days before meeting, and the return tickets within three days from close. No tickets or certificates should be sold to scalpers.

4. If certificate is not to be had at small stations, local fare must be paid to nearest certificate point. Every member should secure certificate even if not to be used, as it will aid in securing the concession for others. No rebate will be allowed on fares of 75 cents or less.

5. The rebate is dependent upon the attendance of 100 who have paid fare, otherwise no benefit is secured.

Wherever the number warrants, arrangements will be made for a special car. From New York city, the following trains and routes are suggested: New York Central, 1 P. M., June 24, single fare, $9.25. West Shore, 6 P. M, June 24, single fare, $8. Lehigh Valley, 6 or 9 P. M., June 24, single fare, $8.

Unless further advised, members should make their own arrangements for berths, chairs and rooms.

RALPH W. POPE, *Secretary.*
26 Cortlandt Street, New York.

The Newark Electric Light and Power Company, of Newark, N. J., has been purchased by Philip N. Jackson and B. M. Shanley, of that city, whose purpose it is to reorganize it, change the name, and put considerable additional capital into the enterprise. The business of the company will be greatly extended, and the cost to consumers proportionately lowered.

STUDY OF EARTH CURRENTS.

BY L. PALMIERI.

Since the discovery of the presence of earth currents by Macrini, numerous experiments have been made to establish the laws and to ascertain the cause of these phenomena. The greater number of observers employed wires laid in known directions, but no notice was taken as to the relative level of the ends of these wires. A note was merely taken as to the orientation of the wires—according to the earth's meridian, to the magnetic meridian and also according to a direction at right angles to the former. The current in the first conductor was called the meridianal current, and the other the equatorial current.

It was usually found that the former flowed from north to south, and the latter from east to west, from which Battelli deduced mathematically that the true direction of the earth current was from northeast to southwest.

The author recalls experiments made in 1852 at the Vesuvius Observatory with reference to atmospheric electricity.

A copper wire 400 metres long was employed for this purpose. It was earthed at one end on the slope of the hill, and insulated as far as the Observatory, where it was connected up to a galvanometer; the other terminal being connected to an insulated conductor fitted with a number of points and mounted on the roof of the test room. When it was not raining no deflection was noted; but when it rained and the conductor was no longer properly insulated, a deflection was noticed, indicating the passage of a current flowing from the hill to the observatory. The same results were obtained after altering its azimuth and making several modifications.

The same results were obtained by Mattenci at St. Maurice and in Tuscany. The same phenomenon was also noticed by Professor Ragona at Modena.

In 1889 the author obtained the use of a telegraphic line eight kilometres long from Resina to the Observatory. The results of six years' observations have shown that when Vesuvius is not active, or during periods of minimum activity, the earth currents flow in an upward direction, irrespective of the azimuth in which the wire is placed, and that these currents increase with a diminution in the activity of the volcano; they diminish when the activity increases and become zero. When this activity reaches a certain degree, then the currents start flowing in the opposite direction. If the action of the crater increases still further, they then continue to increase proportionally with this action.

From the above results it may be stated that:

1. In the case of wires inclined to the horizon and out of volcanic effects, the earth currents flow upwards, in whatever azimuth the wires are placed.

2. In the case of wires placed in the vicinity of an active volcano, these currents diminish, become zero, and then change in direction when the volcanic activity increases. When the currents flow downwards, they increase and decrease with the activity of the volcano.

The experiments carried out since 1889 were made under the following conditions:

From the test room, at an altitude of 637 metres, leave two wires. One is eight kilometres long, lies in a southwest direction, and is earthed at its further end by means of a copper plate dipping into a well. The second, which is shorter by a few hundred metres, is earthed in a valley; a copper plate being buried in vegetable soil to a depth of three or four metres. These two wires are placed in the same azimuth—northwest, southwest. A third wire leaves the test room to be connected to a local earth. This wire is called z, and the two others x and y respectively. The currents in either x or y can be observed by suitably connecting up to the galvanometer. The instruments in use in the test room consist of an astatic galvanometer with double winding, a rheometer, of which a description has been previously given by the author, and a D'Arsonval aperiodic galvanometer.

It was found that on connecting the ends x and y to the galvanometer a very weak current was obtained, being the difference between the two ascending currents. It was noted that when the current reversed it did so in both these wires. The current in the long wire was generally stronger than in the short wire, but during the earthquakes of 1894 it was noticed that the current in the shorter wire became strongest; but in February, 1895, when the shocks seem to have subsided, although the current in the short wire had decreased by one-half, it was still considerably above that in the long wire.

The following general conclusions are arrived at:

1. In the case of wires inclined to the horizon, the earth currents flow upwards, irrespective of the azimuth, so long as the experiments are not carried out in volcanic regions, or, if so, that the volcano be in a state of complete tranquility.

2. If the experiments be made in the neighborhood of an active volcano, the currents will increase and decrease according to the volcanic activity, as stated above.

3. If it is desired to study earth currents irrespective of volcanic action, it would be then necessary to employ perfectly horizontal wires.

It would be necessary to note whether the direction or strength of these currents are affected by local or neighboring earthquakes. It has been noticed on several occasions that at the period of syzygies there is an increase in the earth currents.

KIND WORDS.

BY ALL MEANS THE BEST.

To the Editor of Electrical Review:

I think by all means the Electrical Review is the best paper I get in this line.

E. C. Masters.

Everett, Pa., June 5, 1895.

Therapeutic Action of High Frequency Currents.

We have been engaged during the past year in trying upon a number of our patients the action of high frequency alternating currents generated in the human body by induction with a view to arriving at the clinical demonstration of M. d'Arsonval's physiological discoveries in this direction.

Localized applications of these same currents to dermatology have already been made by Dr. Oudin, but their influence on the system generally, under the most diverse pathological conditions, had not been demonstrated at all. With this view we proceeded, empirically applying almost uniformly the same treatment, which consisted in enclosing the patient in M. d'Arsonval's large solenoid for a period of 15 to 30 minutes each time and, as far as possible, every day. We took particular care to eliminate all other influences, either of special diet, or medicine, subjecting our patients to this treatment only.

From the 20th of January, 1894, to March, 1895, seventy-five patients (34 private patients and 41 hospital cases) have been treated in this manner, and during the same period 267 examinations of urine have been carefully made by M. Berlioz.

The total number of times that these patients were treated was 2,446.

We will now give the results, which have been faithfully recorded, whether positive or negative.

(A)—NEGATIVE RESULTS.

Certain forms of hysteria and of localized neuralgia, such, for instance, as neuralgia of the radial type proved absolutely refractory and derived no benefit from this treatment.

The examination of the urine of these patients, which was made a certain number of times during the course of these applications, showed besides that there had been no appreciable change in the composition of the urine before and after the treatment.

(B)—POSITIVE RESULTS.

The greater number of patients that derived a marked benefit from this treatment were those suffering from nutritive disorders, arthritis, gout, rheumatism, glycosuria, etc.

Nearly all of those showed a marked improvement; but those who derived the greatest benefit were arthritic subjects with articular or neuralgic symptoms. During the first trials, even before any apparent local influence or action on the urinary secretion was observed, the general health seemed to be beneficially influenced, and we noted from day to day the following general symptomatic improvements, making allowances for the slight differences of each particular case:

Restoration of strength, return of appetite, return of sleep, increased cheerfulness and energy for work, the quieting of certain nervous symptoms, more ease in walking, appearance improved, etc.

Subsequently, local troubles, either painful or involving loss of power, were gradually amended; thus a patient, who had been reduced to almost complete powerlessness by coxofemoral arthritis, regained the use of her legs. Another who had been, through sharp pains, unable to close her hand, completely regained the use of it, etc.

Simultaneously with this symptomatic improvement the examination of the urine showed that the diuresis was becoming more satisfactory and that the organic matter was more easily eliminated. Combustion was increased, as was shown by the diminution in the amount of uric acid, whilst the proportion of urea rose. The ratio between these two substances, which before treatment was very high, decreased gradually until it reached the mean proportion of one-fortieth.

The elimination of the mineral elements was also influenced, but in a less evident manner.

We will also mention, reserving to ourselves the right, however, to complete our first results on other patients of the same class, that, in three diabetic subjects, the quantity of sugar diminished considerably, even to the extent of disappearing altogether after a certain number of trials, without any other treatment. In short, the numerous facts that we have observed during the last year place us now in a position to support by a clinical confirmation M. d'Arsonval's physiological discoveries relating to the action of high frequency alternating currents generated in the tissues by induction.

These currents have a powerful influence on the nutritive faculties, and on this account they constitute a mode of treatment of the highest value in a large number of functional disorders caused by inaction or perversion of the nutritive processes.—*Apostoli and Berlioz in Revue Internationale de l'Electricité.*

An Anxious Inquiry from the West.

[*From Western Electrician.*]

Is McGraw going to quit? Will Johnston drive the *Journal* out of the field? These are questions suggested by the present relations of the two eastern trade papers devoted to street railway enterprises. People out here are wondering how street railway men will receive Johnston's methods, how they will like to be relieved of the responsibility of placing their advertisements, and whether they will believe all the pretty stories the newcomer will tell them with an air of child-like simplicity. By the way, what has become of Johnston's *Electrical World*, which its publisher claimed was circulated in every part of the country and reached all the trade? Can it be possible that the "pioneer" is working what the boys would call a "double header" on the trade? Perish the thought!

Springfield, Ill., is seriously considering the question of municipal lighting, and the committee appointed to investigate the subject of lighting in other cities report that in their opinion it can be done for less than half what the city is now paying.

TELEPHONE NEWS AND COMMENT.

To "get together" seems to be the prevailing idea of anti-Bell telephone manufacturers—and a good idea it is.

It is stated that $50,000 worth of stock in one of the new telephone companies is issued for $1,000 cash. This must be on the theory that "water" is a good conductor.

In Owensboro, Ky., a new telephone company has been organized with the collector and the distiller at the head of it. This ought to be a typical Kentucky exchange.

To the Editor of Electrical Review:

The Southwestern Telegraph and Telephone Company invites you to assist at the opening of its long-distance lines in Texas, gentlemen's parlor, Driskill Hotel, Austin, Thursday night, May 30, 1895, from seven to eleven.

Had we been able to travel by long-distance telephone we would have been in Austin, Texas, that night.

Under the heading "Hello Girls Must Go," an exchange announces that Alexander T. Brown, of a typewriter manufacturing company, has invented an automatic telephone. It's real mean of Alex. to drive the girls out this way. Perhaps he wants them all to use his typewriter.

In response to the inquiry of a correspondent in the Electrical Review for a telephone to talk loud and clear, the Gerson Electrical Manufacturing Company, of Philadelphia, state they have it, and that the government test given their transmitter showed as follows: Loudness, 100 per cent; distinctness, 100 per cent; quality, 90 per cent; making a total efficiency of 97 per cent.

A new telephone company is being established in Reading, Pa., by Messrs. C. W. Ream and G. Milton Bair, under the supervising eye of Daniel Drawbaugh himself. The inventor is said to be highly pleased with his new telephone transmitter. A Reading paper says the transmitter is "a simple arrangement consisting of a sponge always adjusted and between the plates a carbon." We await further particulars with interest.

The opening of the long-distance telephone lines of the Southwestern company, at Austin, Texas, May 30, was a decided success. Tables with from four to six trumpets to each were conveniently arranged around the room at which the visitors were seated and permitted to hear a conversation carried on between Dallas and Austin or any other city. The cities connected with Austin were Paris, Fort Worth, Sherman, Dallas and Waco. Of these Paris, 350 miles, was the longest stretch of wire and conversation could be distinctly heard carried on between Austin and that point. Quite a number of those present talked to Dallas and other points and expressed themselves as highly pleased with the working of the line. The gentlemen interested in the company who were present to see that the guests were properly entertained were: General Superintendent, E. K. Baker; Local Manager, E. A. Jeavons; General Auditor, J. E. Farnsworth; and General Cashier, H. L. Sprague, and it is needless to add that these gentlemen saw to it that the guests wanted for nothing. Soon after the lines were opened, Mayor McDonald took his seat at the table and conversed at some length with Mayor Holland of Dallas. A reporter of the Austin *Statesman* seated at one of the tables with an ear trumpet to his ear caught the full conversation and was agreeably surprised to see the interest the Dallas mayor took in the Austin dam. He inquired in particular about it and as to whether the water was wet. Mayor McDonald informed Mayor Holland that everything was all right and getting along nicely. Gen. W. R. Hamby was next in demand and had a brief conversation with Mr. Holland. Superintendent Baker spoke at some length of the work of the company and the extent of its system, saying:

"Extensions of the lines already completed and in operation are being pushed as rapidly as possible, the ultimate result of which will be that within the next 12 or 15 months few, if any, towns of importance within the State but will not be enjoying the benefits of this vastly improved system of telephonic communication. It is anticipated that the long-distance people will build to Memphis the coming Fall. If so, the Southwestern Telegraph and Telephone Company will build from Little Rock, Ark., to Memphis and close the gap from Paris to Malvern, thus connecting all the principal cities and towns of Texas and Arkansas with the entire long-distance system of the United States."

Mr. Frank B. Knight, special agent of the American Bell Telephone Company, also spoke as follows:

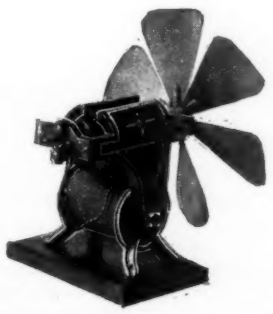
"As most of you are aware, the American Bell Telephone Company is the parent organization under whose fostering care the various licensed companies throughout the United States have conducted and developed their business. With its ample resources of capital and of mechanical and engineering talent, the Bell company has availed itself of every opportunity to bring to a state of perfection the telephone service and nothing gained by its experiments and experience, but that the licensee company has at once reaped the full benefit. And so, as a result of the expenditure of large sums of money and the employment of the highest scientific skill on the part of the parent company and the hearty co-operation and generous outlay by its licensee, the Southwestern Telegraph and Telephone Company, you are enabled to enjoy this very efficient long-distance telephone service, which, as you have heard, is to be extended until some day in the not very distant future the musical tinkling of your signal bell will merely be an announcement that New York desires to talk with you. The long-distance system north of the Ohio river comprises 50,000 miles of pole lines, carrying about 160,000 miles of wire, over which an average of 40,000 conversations pass each day. The longest of these lines is that connecting Boston with Chicago, which exceeds in length that of any line in the world used for a similar purpose, so that in this, as in most other things, America leads creation."

Joining the Scandinavian to the Telephone System of Central Europe.

Shortly after the opening of telephonic intercommunication between Berlin and Vienna, trials were made over a line connecting Trieste and Vienna on the one hand, and Berlin and Hamburg on the other, the compound line thus obtained measuring 1,561 kilometres, or 966 miles. Although the interchange of conversation took place through several switchboards, the result was very satisfactory. There is now under construction a telephone line between Copenhagen and Hamburg, which, when finished, will enable telephonic intercommunication between Trieste, Vienna, Berlin, Hamburg, Copenhagen, Stockholm and Sundswall, a distance of 3,200 kilometres, or 1,984 miles. At present there is regular exchange service between Copenhagen and Sundswall, a distance of 1,350 kilometres, or 836 miles. As is well known to telephone engineers, the Sweedish system, and especially the long-distance service, is excellent, and nowhere in the world can there be found better equipped centrals or more carefully constructed long-distance lines. A few weeks ago, the line between Copenhagen and Odense was opened, and it will be continued via Strib, Fridericia and Kolding, to the German frontier. The conductor is a bronze wire of four millimetres diameter; the same wire of conductor is used between Copenhagen and Malmö, while the next smaller wire (*i. e.*, three millimetres in diameter) has been adopted for the line in Malmö and Stockholm.

A New Fan Motor.

The Dietrichs-Warwick Company, of Cleveland, Ohio, make an extremely neat fan motor, an illustration of which will be seen above.



The Dietrichs-Warwick Fan Motor.

This motor, which is guaranteed to move more wind with less current than others, has a flywheel in the way of a heavy fan which, when necessary, is encased in a nickel-plated guard. A very simple switch enables the user to obtain from one to four speeds.

They report large sales and complete satisfaction on the part of all users.

Improvement in Business.

D. Houston & Company, metal brokers, of New York, in a circular issued June 3, speak of the business outlook as follows:

There are numerous indications that the business world generally is fast emerging from the financial and commercial depression which has been so widely prevalent and keenly felt in every branch of trade during the past two years. The growth of confidence has been very marked, and pessimistic sentiments have been driven from the field before the broad and vigorous movement which has infused new life and animation into all markets for staples and commodities generally.

The business situation has developed into one of great strength and hopefulness. Proofs are constantly multiplying, confirming the widespread character of the revival in business. Europe, apparently, is convinced of the ability and determination of this country to maintain its financial honor and integrity, and has come to the conclusion that American securities and investments offer special inducements to investors.

Manufacturers generally seem well satisfied that business is again re-established upon a sound and safe basis. No better proof of this could be adduced than the voluntary advancing of wages in so many instances lately. More prominently, the Carnegie Steel Company has increased the wages of the men in its various mills 10 per cent, the advance to date from June 1. About 20,000 men participate in the increase. Bradstreet's latest tabulated report on the industrial changes in April and May shows resumption of work in 227 establishments, by which employment was given to 53,400 persons, and 178,000 employés had their wages advanced. There is also an unlooked for improvement in car building. Railroad companies have ordered this year 24,029 freight cars, and have bids out for 3,000 more. The record for the five months of 1895 exceeds that of the entire year of 1894 by over 5,000 freight cars, and represents on freight and passenger cars an expenditure of over $10,000,000. It is thus seen that the renewal of mercantile and industrial activity is of a very pronounced type indeed.

Copper has also awakened from its dormant and lethargic condition, and is in a notably strong position. Since the middle of April the market for this metal has advanced fully one and one-quarter cents per pound in New York, and from £4 to £5 per ton in London. The statistical position of copper, the condition of trade, the relations that the prime factors of supply and demand sustain to each other, are all of such a character as to make the outlook very bright and promising. The concensus of opinion of those best qualified to judge is that we are simply on the threshold of a long period of sustained activity and prices, which will gather strength from purely natural and not artificial causes. The present improvement is regarded as simply the beginning of a decided forward movement that will become more pronounced as time progresses.

ADVANCE INFORMATION.

VALUABLE INFORMATION FOR MANUFACTURERS AND DEALERS.

We publish below the earliest information obtainable relating to new electric railways, new electric light companies, new telephone companies and projected electric construction of all kinds. Every reader will find these columns of special interest, and manufacturers and supply houses will receive many valuable suggestions looking to new business by carefully watching this department in the ELECTRICAL REVIEW from week to week.

New Telephone and Telegraph Companies.

OZARK, MO.—Permission has been granted to the Ozark Telephone Company to use the public highways in this county for the erection of their poles.

EAST THETFORD, VT.—The New England Telephone Company is putting up a telephone line.

OCEAN CITY, N. J.—An effort is being made to have Sea Isle City, Cape May and Ocean City connected by telephone with Atlantic City and other South Jersey towns.

ASHLAND, PA.—The Schuylkill Telephone Company has been incorporated with a capital stock of $25,000.

WILMINGTON, DEL.—The Delmarvia Telephone Company has been organized with the following directors: J. Wilkins Cooch, Anson A. Maher, Mark M. Cleaver, Joseph L. Carpenter, Jr., D. W. Taylor, E. T. Dilworth. The capital is $100,000 with $10,000 paid in.

MCKEE'S GAP, PA —A stock company has been formed to build a telephone line from this place to Bedford.

MONETT, MO.—This place is to be connected with all the towns around by telephone.

MAIDEN ROCK, WIS.—The Union Telephone Company is extending its line from Ono to Rock Elm. This gives Maiden Rock a connection with Rock Elm and Ellsworth.

DETROIT CITY, MINN.—The Detroit Telephone Company has been legally incorporated with a capital stock of $10,000.

BOWLING GREEN, KY.—The East Tennessee Telephone Company is extending its line to Hays, and the telephone line from Brownsville to Rocky Hill Station is being extended on to Hays and Smith's Grove.

TOMAHAWK, WIS.—The Standard Telephone Company has most of the poles set for its new line here.

JOHNSTOWN, PA.—The Johnstown Telephone Company is making arrangements to extend its lines to Ebensburg, South Fork, Wilmore, Lilly and other intermediate points.

NORTH ORANGE, MASS.—There is talk of getting telephone connection between here and Athol via Pinedale and Tully.

OWENSBORO, KY.—The Owensboro Harrison Telephone Company has been incorporated with a capital of $20,000. Incorporators are Col. J. D. Powers, the collector, and R. Monarch, the distiller.

Electric Light and Power.

NEW YORK, N. Y.—The Edison Electric Illuminating Company is about to issue a consolidated mortgage for $15,000,000, for the purpose of retiring existing bonded indebtedness and for extending its plant. The State Trust Company is to be the trustee. The bonds will bear five per cent interest and will run for 100 years. The matter has been under discussion for some time. This is a splendidly managed property.

PENSACOLA, FLA.—The Pensacola Electric Light and Power Company is arranging to run motors during the day for propelling fans and light machinery in the city.

LAUREL, MD.—The Laurel electric light plant has been purchased by a local company, of which Dr. De W. Snowden is president, and has been reorganized under the name of the Electric Company of Prince George's County.

CANTON, ILL.—J. Krishke is inviting bids for furnishing the city with electric arc lights.

SCOTTSDALE, PA.—E. L. Rutherford is inviting bids for furnishing electric lights for streets and public buildings in the city of Brooklyn for the year 1895.

LOS ANGELES, CAL.—Major F. K. Upham, treasurer Pacific Branch National Home for D. V. S., is inviting bids until June 20 for furnishing all the material and labor and completing an electric plant to cost not less than $10,000.

ALFRED, N. Y.—Steps are being taken looking to the establishment of an electric light plant.

FRANKLIN FALLS, N. H.—The Franklin Falls Company will erect a new power house on the island in the river.

SOUTHAMPTON, N. Y.—This village is to be lighted by electricity.

SOUTH HAVEN, MICH.—An electric light plant is to be established here at a cost of $9,000.

CINCINNATI, OHIO.—Pugh Electric Light and Power Company has been incorporated with a capital stock of $5,000.

LA HARPE, ILL.—La Harpe Electric Light and Power Company has been incorporated with a capital stock of $15,000. The incorporators are J. E. Crabill, Geo. Coulson and W. O. Butler.

WINDSOR, CONN.—The electric light plant is to be enlarged at a cost of $6,000.

WEST HAZLETON, PA.—The West End Electric Light and Power Company has been incorporated with a capital stock of $10,000.

WRIGHTSVILLE, PA.—Hereafter this place will be lighted by electricity.

BALTIMORE, MD.—The Maryland Electric Company will erect two electric light and power plant buildings on West Pratt street, adjoining their present works on the east, at a cost of between $25,000 and $30,000.

WESTOVER, PA.—The contract to put in an electric light service at the tannery has been given to U. H. Wieand.

PHELPS, N. Y.—The contract for lighting this village by electricity has been awarded to J. Q. Howe's Sons.

BATTLE CREEK, MICH.—An electric light plant is to be established at the University at a cost of $25,000.

EL PASO, TEX.—Bids are asked until August 2 for furnishing 50 arc lights for five years. W. T. Kitchens, City Clerk.

BLAIRSTOWN, N. Y.—This place is soon to have electric lights.

BURLINGTON, VT.—George D. Sherwin, of this place, has contracted to furnish and equip a 12-mile telephone line connecting Grand Isle with Alburgh. A cable will be used across the lake at the drawbridge.

ELMER, PA.—The borough will soon have the incandescent system of lighting.

WESTPORT, MO. — The Mayor can give information concerning erection of a lighting plant, either gas or electricity.

OMAHA, NEB.—South Omaha Waterworks Company, incorporated by William Paxton and others to erect and maintain waterworks and electric light plant. Capital stock, $1,000,000.

SANDERSVILLE, GA.—The Mayor can give information concerning the issuance of $15,000 worth of bonds for water works and electric light plant.

SCOTLAND NECK, N. C.—W. H. White & Company will erect an electric light plant and are in the market for the purchase of the same.

WHEELING, W. VA.—The La Belle Iron Works has let contract for the erection of an electric and power plant at its works, plant to supply 20 arc lights and 200 incandescent lights and include dynamo to drive motors, lathes, shears and traveling crane.

ST. LOUIS, MO.—J. B. Clayton and others will build an electric power plant.

New Electric Railways.

GIRARD, OHIO.—This place is to have an electric railway.

BEAVER VALLEY, PA.—This place is to be connected with Pittsburgh by a continuous electric line. The Coraopolis, Sewickley & Economy Electric Street Railway Company has been organized. C. I. McDonald, of Pittsburgh, president; Simon Harrold, Beaver Falls, vice-president; George A. Lashell, secretary; W. T. Treadway, solicitor; C. I. McDonald, J. C. Whitla, Simon Harrold, John S. Duss, J. A. Ferguson, George A. Lashell and J. W. Arras, directors. The capital stock is $150,000.

PHILADELPHIA, PA.—It is said the Philadelphia Traction Company is about to buy the Allentown Traction Company's plants and franchises.

ATHENS, GA.—The Athens Electrical Railway Company is in the market for electrical equipment for power or light lines.

NEW ORLEANS, LA.—The Judah Hart Street Railway is almost ready to operate. The track work is all finished and the wires are being strung. It is not known when the cars will be put on, as it is doubtful that the electric light plant can furnish enough power at present to operate the line.

KANSAS CITY, MO. — The Kansas City & Independence Air Line Railroad will probably build an electric power plant.

DANVILLE, VA.—The Danville Street Car Company's new electric plant is expected to contain a new dynamo of about 100 kilowatts capacity, a new engine of about 150 horse-power, a boiler of about 50 horse-power, etc. R. P. Jones, president, is in the market for the purchase of the electric plant.

CLARKSVILLE, TENN.—Address William M. Daniel, president Clarksville City Railway Company, concerning purchase of electric railway machinery and equipment, proposals for which are now being invited.

WASHINGTON, D. C.—The Washington & Great Falls Electric Company is considering an issue of $500,000 in bonds. It proposes building an electric road from Washington to Cabin John bridge on the Potomac River. Stilson Hutchins is interested.

LOUISVILLE, KY.—The Louisville City Railway Company has let contract for the building of three miles of electric line in the suburbs.

ROSSVILLE, GA.—Address Abner L. Ross concerning the proposed electric line which is to be built from Rossville to Chickamauga Park.

PHŒNIX CITY, ALA.—The Phœnix City Railway Company has been incorporated by J. F. Flournoy, L. F. Garrand and others, to build a line three miles long. Capital stock, $30,000.

ANNISTON, ALA.—The Anniston City Electric Railway Company, of which O. E. Bigsby is manager, has decided to change its line to a trolley system. It controls six and one-half miles of line.

MERIDIAN, MISS.—The Meridian Light and Traction Company has been incorporated by L. B. Bradley, S. H. Gehlman and R. F. Cochran, for the erection of a plant to supply electric light and power. Capital stock, $150,000.

ST. LOUIS, MO.—The St. Louis Traction Company will build an electric power plant.

New Manufacturing Companies.

TRENTON, N. J.—Articles of incorporation have been filed for the Bell Electric Company, which will manufacture electrical appliances. The capital stock is $100,000. The stockholders are: Frank M. Bell, New York; George W. Westbrook, New York; William Childs, Brooklyn; Abram Robinson, Trenton.

HILLSDALE, MICH.—The Electric Dry Print Company has filed articles of incorporation. The object is to manufacture the device recently invented by Professor A. C. Rideout for preventing the development and accumulation of and discharging electricity from dry paper while in process of printing. The incorporators are: S. Clark Rowlson, E. Isaiah Frankhauser, Fred H. Stone and A. C. Rideout.

MILWAUKEE, WIS.—The Milwaukee Electric Manufacturing Company, with a capital stock of $8,000, has filed articles of incorporation with the Register of Deeds. The incorporators are John E. McKivett, Mathias Weisser, Joseph C. Schmitt and Henry W. Newton.

NEWTOWN, N. Y.—Articles of incorporation have been filed with the Secretary of State by the Newtown Light and Power Company, which proposes to manufacture and sell electricity for light, heat and power. The amount of capital stock is $20,000, and the directors for the first year are: J. C. Smith, of Babylon; George B. Gallagher, of Brooklyn; Francis McKenna and George S. Jervis, of Maspeth.

DETROIT, MICH.—Articles of association of the Globe Electrical Company have been filed. It has a capital stock of $10,000. Will H. Palmer, Scott H. Morris and Friend Palmer are the stockholders.

INDIANAPOLIS, IND.—The Manufacturers' Building and Power Company has filed articles of incorporation. The incorporators are Julius D. Pratt, Addison Bybee and Nathan Morris. The capital stock is $100,000. The object of the company is to manufacture, produce and furnish any and all kinds of motive power for manufacturers.

MCCORDSVILLE, HANCOCK COUNTY, IND.—The Springer Electric Company has been incorporated by T. L. Springer, S. Morrison and A. C. Morrison for the purpose of manufacturing electrical apparatus and operating telephone exchanges.

Business Troubles.

NEW YORK, N. Y.—The Electrical and Mechanical Engineering Company, 41 Cortlandt street, is insolvent, and Judge Andrews, of the Supreme Court, June 5 appointed Jonathan H. Vail receiver for the concern on the application of the directors, J. H. Vail, Edward S. Lorsch, Eugene Fay and Herbert S. Wynkoop. Mr. Vail is president of the company and the largest stockholder. The liabilities are $26,441; nominal assets, $22,000. The principal asset is a contract for electric lighting the Brooklyn Bridge cars, which is put down at $19,419.

NEW YORK, N. Y.—Thomas W. Ridsdale and Thomas A. Lewis, composing the firm of Ridsdale & Lewis, machinery and supplies, 39 Cortlandt street, made an assignment, June 6, to Edward Swann without preference. The liabilities are about $10,000, assets $8,000.

NEW YORK, N. Y.—Sprague Electric Elevator Company; F. W. Whallon has secured a judgment for $1,711.

UNIONTOWN, PA.—The electric railway has been levied on by the United States Marshal. The levy is made on an old execution by the Edison company for $4,000. This is the amount of the original cost of the road yet unpaid. The matter will probably be amicably settled.

NEW YORK, N. Y.—Ernest Hall was appointed temporary receiver yesterday for J. C. Thompson & Company, of No. 66 Broadway, in a suit brought by Royal C. Vilas, of that firm, against his partners, John C. Thompson and Chas. A. Starbuck. The firm was formed solely for the purpose of constructing and equipping the Port Richmond and Prohibition Park Electric Railway, and the partners have disagreed on the terms of dissolution and division of the assets.

NEW YORK, N. Y.—William P. Allen has been appointed receiver for William B. Frink, electrical engineer, of 108 Fulton street, on the application of John Hennessy, a creditor.

Increase of Capital Stock.

GAITHERSBURG, MD.—The Montgomery County Telephone Company has decided to increase its capital stock to $10,000, for the purpose of extending its line to other towns desiring telephonic connection with this place.

WANTED.—Position by a young man in a place where he can learn Electrical Engineering. Not afraid of work. Can furnish references. Full particulars. Address "R. B." ELECTRICAL REVIEW, 13 Park Row, N. Y.

For Sale or Trade for Real Estate.

A complete incandescent lamp plant. Capacity 1,000 lamps daily. For particulars address ECKART ELECTRIC CO., *Fort Wayne, Ind.*

I am prepared to furnish
CHESTNUT POLES,
all sizes, for Electrical Purposes.
E. GRAHAM, Conowingo, Md.

FOR SALE.
1,000 OCTAGON PINE POLES,
26 to 28 ft. long. Other Sizes Cut to Order.
J. T. DENNY & CO., BUIE, N. C.

Electrical Instruments and Fine Machinery.
MODEL AND EXPERIMENTAL WORK.
R. R. COMMUTATORS REFILLED.
E. V. BAILLARD, 106 Liberty St., N. Y.

EXPERIMENTAL WORK.
Metropolitan Chandelier and Electric Supply Works,
HUDSON & 12th STS., HOBOKEN, N. J.
Arc Light Repairing.

THE LEHIGH VALLEY
CREOSOTING CO.
WORKS, PERTH AMBOY, N. J.
Office, Rooms 136 and 137, 1 Broadway, NEW YORK.
Creosoted Lumber, Underground Conduits, Telegraph Poles, Piling and Ties Furnished.

MOTHER OF PEARL
Made into any design for Electrical Trimmings, Push Buttons, Knobs, Handles, etc. Can be made to cost no more than other material.
HENRY CHARLES EULER,
513 BROADWAY, NEW YORK.

Sight Feed Oil Cups. AUTOMATIC "WIPING DEVICE" For oiling Crank and Cross-head Pins.
WM. H. WILKINSON & CO.,
352 Atlantic Ave., Boston, Mass.

PL DIXON'S PERFECT LUBRICATING GRAPHITE.
The most Marvelous Lubricant Known.
Used Dry, or Mixed with Water, Oil or Grease.
NOT AFFECTED BY HEAT, COLD, STEAM OR ACIDS.
An Interesting and Instructive Pamphlet will be sent Free of Charge.
JOS. DIXON CRUCIBLE CO. Jersey City, N. J.

WEATHER-PROOF TRADE MARK "O.K." LINE AND HOUSE WIRES

AGENCIES:
ELECTRIC APPLIANCE CO., CHICAGO, ILL.
PETTINGELL-ANDREWS CO., BOSTON, MASS.
ELECTRICAL ENGINEERING CO. MINNEAPOLIS, MINN.
ST. LOUIS ELECT'L SUPPLY CO., ST. LOUIS, MO.
BRADFORD BELTING CO., CINCINNATI, O.

PHILLIPS INSULATED WIRE CO.,
NEW YORK OFFICE: 39 & 41 Cortlandt Street.
FACTORY: PAWTUCKET, R. I.

THE TILDEN
Watchman's Electric Time Recorder

The latest and most perfect station recorder on the market. It cannot be tampered with. False records cannot be made. Ordinary electric press buttons can be used for operating this clock, or we can furnish our non-interferable buttons, with keys, when desired.

Capacity 1 to 20 Stations. Write for prices.

W. B. SOUTHGATE & CO.,
General Agents,
146a FRANKLIN STREET,
BOSTON, MASS.

ESTABLISHED 1867
PARTRICK & CARTER CO.
ELECTRICAL SUPPLIES
125 South 2d St. Philadelphia
CATALOGUES ON APPLICATION
Send Business Card and Mention ELECTRICAL REVIEW.

FIRE.

The destruction of our Works by fire on April 7th was almost complete.
We have already resumed manufacturing and are making limited shipments, which are daily increasing.
Send us your orders. We will fill them with reasonable despatch, or advise you promptly if we cannot.

CROCKER-WHEELER ELECTRIC COMPANY,
Manufacturers and Electrical Engineers.
New York. Chicago. Boston. Philadelphia.
Sizes up to 250 H. P.

STANDARD "WARD" ARC LAMPS,
$10.00 EACH,
Including Resistance, Clear Globes and Tested Ready for Use. This price for 6½, 8 and 10 Ampere Lamps sold in pairs. SINGLE LAMPS, with Large Resistance, Globe, &c., $12.00. In Lots of 50 or more as received from the Manufacturer, without Globes, Resistance or Testing, $7.50 EACH.
"KNIGHT" DIRECT-CURRENT LAMPS furnished complete, with Clear Globes, Resistance and Testing, $9.00 EACH.

"KNIGHT" ALTERNATING CURRENT LAMPS, COMPLETE,
$10.00 EACH.
Also, "Ward" and "Knight" High-Tension Lamps for series Circuit, Railway Lamps, Twin Lamps, Focusing, Photo-Engraving and Stereopticon Lamps
AT LOWEST PRICES.

CARBONS, Lacombe, Hardtmuth, Siemens and Halske, National, Fidelity, Solar, Lancaster, Globe, at Lowest Prices.
Address, CHAS. H. WATERMAN, 1305 Havemeyer Building, 26 CORTLANDT ST., NEW YORK.

KINDRED INTERESTS

The Emerson Electric Manufacturing Company, St. Louis, Mo., have issued a very attractive catalogue, printed in colors, describing their alternating current motors.

The Proctor-Raymond Electric Company, Rochester, N. Y., report an increasing demand for their improved form of annunciators and a better business outlook than has been in sight for some time.

The '95 Kester arc lamp, manufactured by the F. P. Little Electric Construction and Supply Company, of Buffalo, N. Y., is fully up to the company's expectation and the season's sales have been excellent.

The Dayton Fan and Motor Company, of Dayton, Ohio, has appointed McCloud, Ward & Company, 91 Liberty street, New York, and F. H. Stewart & Company, 20 North Seventh street, Philadelphia, eastern agents for their machines.

The Metropolitan Electric Company, 186-188 Fifth avenue, Chicago, have recently received some good orders for the Keystone instruments, for which they are the western selling agents. They guarantee the round type switchboard instruments to be correct within two per cent and the standard Keystone type within one per cent. The Missouri Light and Power Company, of St. Louis, Mo., recently placed an order for 136 of these instruments, after making a very severe test on all makes now on the market. This speaks well for the quality of the Keystone.

The Dieterichs-Warwick Electric Company, of Cleveland, Ohio.—Mr. Percy B. Warwick, electrical superintendent of this company, who was formerly employed by the Woodward Electric Company, of Detroit, Mich., Roberts Storage Battery Company, of Toronto, Canada, and latterly in charge of the storage battery department of the Ford-Washburn Storelectro Company, of Cleveland, Ohio, has perfected a new method of making storage battery elements, by which he builds up his plates by a plating or depositing process, which is claimed to be a great improvement on the Faure or Brush process of pasting. The improvement is Mr. Warwick's personal property, and he hopes to organize a company shortly to work it. Until then, however, the process will be used by the company he is with.

The Globe Electric Construction Company, 29 West 26th street, New York, are a new company recently incorporated, with ample capital, and have every facility for handling all kinds of electric construction work in a first-class manner. While the style of this company is new, its personnel consists of some of the oldest and most experienced men in the business. All of its officers, with the exception of the president, have been engaged in this line of business for the last eight years, and are well known to the architects and the building trade. The officers of the company are centrally located and up-to-date. The company are making a big and vigorous bid for business, and their success from the start has been extremely satisfactory. They are fully equipped and prepared to do all kinds of isolated plant, house wiring, central station and railroad work, and are prepared in every case to furnish bonds for the satisfactory execution of any work intrusted to them. The officers of the company are: John J. Clark, president, P. M. Mowrey, vice-president and general manager, H. C. McKenzie, treasurer, John G. Phillips, secretary, J. M. Ketcham, general superintendent.

Graphite Paint.—Twenty-five or 30 years ago the Dixon company, of Jersey City, N. J., who even at that time were known the world over as the largest manufacturers of graphite products, began the manufacture and introduction of graphite paint. Ticonderoga flake graphite was used and thoroughly ground in pure, boiled linseed oil. Roofs well painted with this paint did not require repainting for 10 to 15 or even 20 years. In time all this became a matter of record, and people recognizing the economy, as well as the durability of Dixon's graphite paint and its great superiority over mineral paints, demanded that their roofs should be painted with it. This demand, however, has led many painters to resort to sharp practices, or to make a graphite paint which they claim to be equal to Dixon's. Some painters are unprincipled enough to offer as a graphite paint a compound having the color of graphite, but composed of stove-polish, cheap black lead or even foundry facings, mixed with oil. Some time ago one of the departments of the United States Navy ordered 100 pounds of Dixon's graphite paint of a well-known dealer. The dealer, not having that quantity on hand in an original package, filled a keg from a barrel of Dixon's paint and sent it forward. It was promptly returned by the government officials with the remark, that they had experimented enough with other makes and would only receive original packages.

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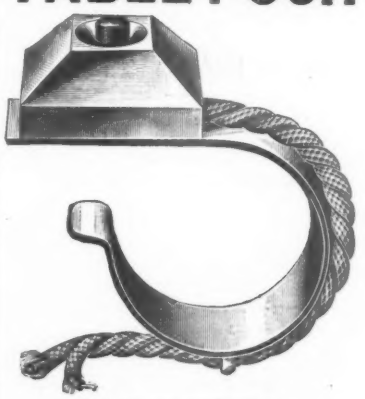

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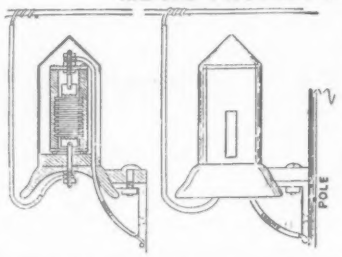

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